



HUGO ANDERSSON

Taxonomic and phylogenetic studies
on Chloropidae (Diptera) with special
reference to Old World genera

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Taxonomic and phylogenetic studies on Chloropidae (Diptera) with special reference to Old World genera

By

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Fil. lic., Hld

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Contents

Abstract	5
Introduction	5
Material and methods	6
On the theories and procedure of phylogenetic taxonomy	7
Taxonomy	7
The principal elements of taxonomy	7
The main theories of taxonomy	7
Phylogenetic taxonomy	8
Introduction	8
Definitions of various concepts	8
What is "a true phylogenetic taxonomy"?	11
On the basic concepts of phylogenetic taxonomy	12
Monophyly proved by synapomorphy	12
Difficulties associated with parallelism	13
The procedure of phylogenetic taxonomy	13
Reconstruction of the phylogeny	13
Construction of the classification	16
General and phylogenetic characteristics of Chloropidae	17
The systematic position of Chloropidae within Diptera	17
General description of Chloropidae and explanation of terminology	23
Character transformation within Chloropidae	30
Description of the hypothetical stem species of Chloropidae	43
Rejection of Griffiths' "periandrial theory"	44
Taxonomy and classification of Chloropidae	45
Family Chloropidae Rondani, 1856	45
Subfamily Siphonellopsinae Duda, 1932	46
Subfamily Oscinellinae Becker, 1910	55
Tribus Rhodesiellini n. trib.	55
Tribus Oscinellini Becker, 1910	63
The <i>Javanoscinis</i> genus group	65
The <i>Elachiptera</i> genus group	65
The <i>Gaurax</i> genus group	76
The <i>Dicraeus</i> genus group	81
The <i>Lipara</i> genus group	83
The <i>Polyodaspis</i> genus group	91
The <i>Aphanotrigonum</i> genus group	96
The <i>Oscinella</i> genus group	109
The <i>Eribolus</i> genus group	113
Genus not attributed to a genus group	116
Subfamily Chloropinae Rondani, 1856	117
The <i>Platycephala</i> genus group	120

The <i>Mepachymerus</i> genus group	132
The <i>Semaranga</i> genus group	135
The <i>Chlorops</i> genus group	137
The <i>Diplotox</i> a genus group	148
The <i>Cetema</i> genus group	150
The <i>Thaumatomyia</i> genus group	152
The <i>Cryptonevra</i> genus group	158
The <i>Eutropha</i> genus group	159
The <i>Neoloxotaenia</i> genus group	164
The <i>Centorisoma</i> genus group	171
The <i>Assuania</i> genus group	172
Genus not attributed to a genus group	180
Figures of wings	182
Phylogenetic relationships within the family Chloropidae	190
Concluding remarks	192
Acknowledgements	192
References	194
Abbreviations	198
Index	199

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Abstract

The first section of this paper deals with some concepts that are of great importance in connection with a phylogenetic taxonomy, for instance the definitions of monophyletic, paraphyletic and monophyletic groups, the differences between the various types of homologous structures such as homologues, convergences, euparallelisms and pseudoparallelisms and the various types of speciation. What type of taxonomy is "a true phylogenetic taxonomy" is discussed. Difficulties in connection with the phylogenetic procedure caused by parallelism are demonstrated, as is the influence of secondary dichotomy due to extinction in lines that have had a polytomous evolution.

A second section treats the family Chloropidae, its relationships with other families, its morphology and definitions of the terms used in the descriptive section. The most important character transformation series within Chloropidae are described as a necessary basis for determining whether the various character states are to be classified as plesiomorphous or apomorphous. A short description of the hypothetical stem species of Chloropidae is given. The "periandrial theory" of Griffiths is discussed and criticized.

The third section of the work treats the taxonomy of the family based on a study of 98 Old World genera or subgenera. They are described and figured, and classified into the three subfamilies: the Siphonellopsinae, Oscinellinae and Chloropinae. Keys to the genera, largely based on the male genitalia, are appended. In Siphonellopsinae five genera are treated, two of them, *Protohippelates* and *Siphonellopsina*, are described as new. In the subfamily Oscinellinae two tribes, Rhodesiellini n. trib. and Oscinellini are distinguished. Six genera of Rhodesiellini are treated. In the tribe Oscinellini, 41 genera or subgenera are described and grouped into nine genus groups. *Javanoscinis* n. gen. is described. In the subfamily Chloropinae 46 genera or subgenera are treated and grouped into twelve genus groups. The following taxa are described as new: *Meromyzella* n. gen., *Globiops* n. gen., *Ensiferella* n. gen., *Anthracophagella* n. gen. and *Diplotoxoides* n. subgen. Finally the phylogenetic relationships within the family are discussed. The following new species are described: *Siphonellopsina kokagalensis* n. sp., *Myrmecosepsis taprobane* n. sp., *Globiops brunnescens* n. sp. and *Ensiferella ceylonica* n. sp., all from Sri Lanka.

Introduction

The first chloropid fly designated under the binomial system of nomenclature was *Musca frit* Linnaeus, 1758, although Linnaeus had already described this insect in 1750. The second species described under the system was *Musca saltatrix* Linnaeus, 1761, first mentioned in Fauna Suecica, 1746.

Several chloropid species were assigned to the genus *Musca* L. by Scopoli, Bjerkander, Schrank and Fabricius. *Chlorops* Meigen, 1803, was erected as the first separate chloropid genus. Latreille, as early as 1804, described the genus *Oscinis* which is an objective junior synonym of *Chlorops* (isogenotypic, according to Sabrosky 1941).

In 1810, Fallén listed *Oscinis* Latr. in the family Micromyzides. In 1820, Fallén erected

the family Oscinides, but included chloropid, milichiid, agromyzid and ephydrid species in the family. Oscinides was not accepted by Meigen or Macquart. Meigen (1830, 1838) included the chloropids in the comprehensive family Muscides. Macquart (1835) placed the chloropid genera in various subtribes within the section Acalypterae. Macquart's subtribes are equivalent to the present families.

Meigen (1830, 1838) divided the genus *Chlorops* Meig. into two sections on the basis of whether or not the costa reaches r_{4+5} or m_{1+2} . Macquart (1835) used the generic name *Chlorops* Meig. for the first section and the generic name *Oscinis* Latr. for the second. Rondani (1856) erected the sub-families (stirps) Chloropina and Oscinina for the two sections and placed them in the family Agromyzidae.

The family name Oscinidae was extensively

used during the 19th century but was later replaced by Chloropidae. The latter was commonly used in the more important taxonomic works after the synonymy between *Chlorops* Meig. and *Oscinis* Latr. had been established, and the subfamily Oscininae had been replaced by Oscinellinae (Becker 1910). No further attempts to subdivide the family were made until Duda (1930) proposed the subfamily Palaeoscinellinae (invalid, not founded on a generic name; Sabrosky 1941) or Hippelatinae for the *Hippelates* genus-group. In 1932, Duda erected the subfamily Siphonellopsinae and united the remaining genera in the subfamily Chloropinae, although these were grouped into the three tribes Chloropini, Oscinellini and Hippelatini. Enderlein (1934) recognized the three subfamilies Chloropinae, Oscinellinae and Siphonellopsinae (together with a fourth subfamily, Heringiinae, although this as founded on the agromyzid genus *Heringia* Enderlein, 1934). More recent authors have reunited the genera of Siphonellopsinae and Hippelatinae with the Oscinellinae without any grouping into tribes or generic groups.

Because numerous genera have been described in the Chloropidae (Sabrosky 1941, 1964, listed 284 nominal genera, inclusive of emendations, but stated that 96 of them were invalid due to preoccupation or were objective or subjective junior synonyms) and no attempts have been made to outline the phylogenetic relationships, the general picture of the family seems rather confusing. Furthermore Duda and earlier authors founded many genera on few (or even one) characters, often of minor significance (dusted or shining frontal triangle, thickened or white-coloured arista etc.). Some authors, especially Duda, Sabrosky and Nartshuk, have largely concerned themselves with relationships or perhaps more accurately, with the similarities between various genera, and this has undoubtedly led to many closely related genera having been grouped together. It is not uncommon to find that relatively distantly related genera have been compared on rather insignificant grounds. Thus Nartshuk (1963) compared the new genus *Chaetoscelis* (belonging to Siphonellopsinae) with *Epimadiza* (belonging to Oscinellinae). Also Duda seemed to be aware of the indistinctness of the genera he accepted, because he often constructed a common key for species of many genera.

In spite of the doubt about the universal applicability of phylogenetic taxonomy (see p. 13), I have tried to trace the phylogenetic

relations within Chloropidae and to determine the most useful characters for delimiting the genera. If the phylogenetic procedure really unveils the phylogeny (evolutionary history) of a particular group it should also be applicable for parts of that group, provided the character states can be satisfactorily settled. This seems possible with the material presently available. For reasons of nomenclature, the analyses should include the type species of the genera so as to facilitate, from the onset, the naming of the monophyletic groups which are found. The second step is then to delimit the complete genera and to describe their range of variability. It has not been possible to examine the type species of all genera treated, and in these cases I have taken well-known species as representatives for the genera in question. I have also been wary of changing the status of an established taxon when its range of variability is incompletely known (for instance in large genera where I have only seen a few species).

Material and methods

The present investigations were carried out mostly on dry, pinned specimens. Several museums and scientists have generously put determined material, including type specimens, and also undetermined material from various parts of the world at my disposal. My own collections from Fennoscandia, Sri Lanka and Ethiopia have also been used.

The dry specimens have been studied by Leitz Wetzlar binocular microscope at a magnification of 12.5, 50 and 150 times. A Schott Licht-Quelle KL 150 was used as light-source.

Most of the drawings have been made with a Leitz Wetzlar Ultropaque microscope equipped with a drawing prism. Figures of head, antennae, thorax, scutellum, and legs were made under reflected light, usually at a magnification of 32, 50, 65 or 110 times. The pinned specimens were thereafter relaxed in a moist chamber for a few hours and the abdomen, middle legs or other parts removed. For studies of the genitalia and the femoral organ the legs and abdomens were treated with hot 10 % potassium hydroxide. Some structures were stained by a 70 % solution of Chlorazol Black E in ethanol. These potassium hydroxide treated structures were drawn by means of the ultropaque microscope under transmitted light. The male genitalia were drawn at a magnification

of 65, 110, 220 or, in a few cases, 320 times, the femoral organs at 320 times, except those in fig. 13 which were drawn from microphotographs. The removed wings were photographed and copied to give the same length.

On printing the figures were usually reduced to $1/2$ or $2/5$ of their original size. Because I consider the exact magnification of the published figures of minor importance in this context I have refrained from stating these data.

On the theories and procedure of phylogenetic taxonomy

Taxonomy

The principal elements of taxonomy

In the branch of science to which this study belongs, there are two related concepts, "systematics" and "taxonomy"

Systematics has been defined by Simpson (1961: 7) as "...the scientific study of the kinds and diversity of organisms and of any and all relationships among them". This definition has also been accepted by Mayr (1969: 2).

Taxonomy has been defined by Mayr (1969: 2) as "...the theory and practice of classifying organisms".

In the following pages some aspects of the last-mentioned, more restricted concept, will be treated.

Within taxonomy there are two outstanding problems that have to be solved before a generally accepted and consistent result can be obtained.

The first is *to establish a taxonomic theory*. This should clearly state the kinds of evidences to be used as a bases for the classification and the type of classification it is intended to construct.

The second problem is *to create a taxonomic procedure* that will make it possible to construct the expected classification.

It is important to recognize the proper relation between theory and procedure; that is to recognize that the taxonomic procedure is a tool which is used to produce a desired result. There are examples of the reverse: that a taxonomic theory has been invented to fit and justify a taxonomic procedure. Thus the theory of *numerical taxonomy* was created to allow

the computer to be used as a universal tool for all taxonomic work.

Classification is "the delimitation, ordering and ranking of taxa" (Mayr 1969: 400).

When making a classification it is necessary to work with some kinds of units — *taxa*. The only taxa present in nature that are defined by functional biological evidence are the species (or most of them). All other taxa of higher or lower rank are man-made artifacts. There is no natural system which can be used to construct a classification with natural taxa of various rank (except a classification involving millions of side-ranked species). Even if an attempt is made to use "natural groups" such as monophyletic taxa, there are several important aspects which need to be settled, such as the number of categories to be used and the criteria for assigning a special rank to certain taxa. The classification must therefore be largely influenced by the taxonomist's personal view. One of the basic requirements of a classification is that it is utilitarian: classification should be a useful too in all branches of biology. However, there are different views about what is useful. Consequently, the demand on the classification, and therefore much of its detailed formation, must be established by general agreements.

The main theories of taxonomy

Mayr (1969: 54—86) has provided a survey of the various theories on the classification of organisms. At present there are three important taxonomic schools within zoology based on fundamentally different basic concepts.

The *numerical taxonomy* (Sokal & Sneath 1963) is based exclusively on the degree of phenetic similarity between organisms, regardless of whether or not this similarity depends on patristic affinity, convergence, parallelism or other factors. By numerically evaluating a selected set of unweighted characters it is possible to define taxa, evaluate the rank of taxa and to construct classifications. This approach is totally non-biological towards the species concept and the criteria for delimiting taxa of all categories. Nevertheless it is maintained that numerical taxonomy can contribute to an understanding of the phylogeny of organisms.

The *evolutionary taxonomy* (Mayr 1969: 76—77) maintains to work phylogenetically because it is based on patristic affinity, i.e. the portion of phenetic similarity that is due to related genomes. The more similar the genomes

of two taxa, the closer is the affinity or phylogenetic relationship between them. Evolutionary taxonomy emphasizes the biological species concept. Taxa of higher rank are not constructions but are natural existing groups produced by evolution. Both monophyletic and non-monophyletic taxa are accepted.

The *cladism* (Mayr 1969: 70—76) represents another school of phylogenetic taxonomy. Taxa are defined by means of various kinds of apomorphous characters that indicate that the elements of each taxon are derived from a common ancestor. In theory but not in practice the biological species concept is accepted and use is made of natural existing monophyletic taxa. The more recently two taxa have had a common ancestor the closer is the affinity or phylogenetic relationship between them. The cladism works with strictly monophyletic taxa and bases its classification on the positions of the branching points of the evolutionary lines.

Phylogenetic taxonomy

Introduction

It is a striking feature of taxonomic papers produced by the various taxonomic schools that great emphasis is placed on special concepts, especially phylogeny, monophyly and related ideas. Even the proponents of numerical taxonomy claim, in spite of its non-biological basis, that it can produce (at least almost) phylogenetic classifications. Proponents of evolutionary and cladistic taxonomy maintain that they work phylogenetically, but at the same time they deny that the other school works phylogenetically, or at least strictly phylogenetically. There seems to be a tendency to define “valuable” concepts in a way that make the concepts possible to use for their own school but not for the competing one. Thus Ashlock (1971) uses the term monophyletic group in a wider sense more suitable for evolutionary taxonomy, and assigns the less attractive word “holophyletic” for the strictly monophyletic concept used in cladistic taxonomy.

There has been much discussion concerning the demands which should be placed on a classification (Mayr 1969: 77—79, Sokal & Sneath 1963: 11—20, Hennig 1966: 9—10). It has been said, for example, that a classification should “be as useful as possible”, “contain a maximum of useful information for all biologists”, “be a general reference system”, “be

natural in the meaning that it is a general arrangement intended for general use by all scientists” and “be natural in the meaning that it is based on phylogeny”.

Brundin (1966: 14) has stressed that “the organisms form a multidimensional manifold, meaning that they differ from one another in different respects (directions) which are not referable to each other”, “for the classification of a multidimensional manifold there are just as many possibilities available as the number of actual dimensions” and “there is one dimension to which all other dimension are referred, and that is the time dimension”.

This means that it is possible to construct many different classifications based on the various kinds of connections or relationships between the organisms since these relationships are largely independent of each other and therefore more or less different. But all these relationships between the organisms result from the evolutionary processes that proceed with time. Because time is the same for all organisms, it should be possible to base a classification on the time dimension to which classification all relationships between the organisms are referable. This would produce *one* classification as a general reference system for all organisms. Apparently it is the aim of the phylogenetic taxonomy elaborated by Hennig to produce such a classification.

Definition of various concepts

The following discussion is restricted to sexually reproducing species. Before entering into a discussion on phylogenetic taxonomy there are some general concepts that need to be discussed and defined:

Natural in such combinations as natural taxa, natural system, natural classification, etc. will be avoided, because it is often used incorrectly to mean “general” or “most useful” etc.

Biological will be used to indicate a real existing causal relationship caused by evolution.

The *biological species concept* regards the species as a natural functioning entity, defined as a group of potentially interbreeding individuals, that is reproductively isolated from other such groups due to the possession of genetically controlled isolating mechanisms. “Potentially” means that a male and a female can mate and produce progeny, if they meet, without difficulties caused by their genomes.

Thus, individuals from different areas or different generations (times) that have genomes so similar that no reproductive barrier is produced, belong to the same species.

Phenetic concerns those concepts that are based on the degree of overall similarity (phenetic resemblance).

Phylogeny. Mayr (1969: 409) defined phylogeny as "The study of the history of the lines of evolution in a group of organisms; the origin and evolution of higher taxa". The first part of this definition is very important because it emphasizes the history of evolution, that is the kinds and successions of events in the evolutionary change of a line of evolution. But phylogeny does not mean only the study of that history, but also the history itself.

The use of the term *phylogenetic* can be used to denote all concepts that are based on or deal with phylogeny (history of evolution). Thus a phylogenetic taxonomy must be based on a study of the kinds and successions of the events in evolution.

If the view is accepted that phylogeny means "phyla-genesis" (cf. Schlee 1971: 7), i.e. the development of taxa, then a phylogenetic taxonomy means one that is based on a study of cladogenesis.

Monophyly is defined as "the origin of a group of species from a common stem species" (Hennig 1966: 207). There are several similar definitions of a monophyletic group. Ashlock (1971) has discussed these definitions. Hennig (1966: 73) states that "*A monophyletic group* is a group of species descended from a single ('stem') species, and which includes all species descended from this stem species". Hennig's definition does not include the stem-species ("the most recent common ancestor") in a monophyletic group. Ashlock (1971) provides a new definition: "A monophyletic group is one whose most recent common ancestor is cladistically a member of that group" i.e. the stem-species is included in the monophyletic group. This is a useful definition for phylogenetic taxonomy and is in accordance with its main concepts, especially because the synapomorphies, by which a monophyletic group is defined, are derived from and were present in the stem-species. Ashlock has used the term "holophyletic" for the complete monophyletic group, the only kind of group that is accepted in Hennig's taxonomy, while the *paraphyletic* group (=incomplete monophyletic group) is included as a subgroup in the concept of the "monophyletic group". Both complete and in-

complete monophyletic groups are considered to be justified in an evolutionary taxonomy that maintains itself to be phylogenetic. A *polyphyletic* group, according to Ashlock, is one in which the most recent common ancestor is not cladistically a member of that group. The diagrams produced by Hennig (1966, fig. 45) and Ashlock (1971, fig. 2) are not clearly defined as regards paraphyletic and polyphyletic groups. Thus groups AB and CDE in Ashlock's fig. 2 are either paraphyletic or polyphyletic depending on which ancestor is included (fig. 1c, 3) and 4)). The diagram of Hennig (1966, fig. 45) presupposes the inclusion of ancestors as indicated in fig. 1a.

Ashlock (1973) rearranged the definitions of these concepts more in accordance with those for phylogenetic taxonomy, with monophyletic (=holophyletic), paraphyletic or polyphyletic groups; but Ashlock stressed that these definitions were not completely adequate for the purpose of evolutionary systematics.

Because the procedure for phylogenetic taxonomy is entirely dependent on autapomorphic or synapomorphic character states it is necessary to strictly apply the concepts of homology, parallelism and convergence. But in literature dealing with phylogenetic taxonomy the differences between these concepts are not always clear-cut. For instance, an example of convergence given by Hennig (1966, fig. 44) would be regarded by many as actually being a case of parallelism.

Homology, according to Simpson (1961: 78), is resemblance due to inheritance from a common ancestry. This means that *homologues* are homologous structures in different evolutionary lines which are similar; the similarity having evolved in a common ancestor-line (fig. 2, A). The situation is very different for *convergences* where non-homologous structures have become similar due to independent development in different lines (fig. 2, B). Homologous structures are also involved in the case of parallelism. There appears to be two distinct types of parallelism, each with a special evolutionary history. In *eu-parallelisms* (fig. 2, C) both evolutionary lines have the homologous structure in the same character-state when the lines separated. The characters then change in the same way, although not necessarily at the same rate, so that the final character-states are the same. This occurs, for instance, when wings of the same common structure in an insect family become separately reduced in different lines, but nevertheless reach the same final

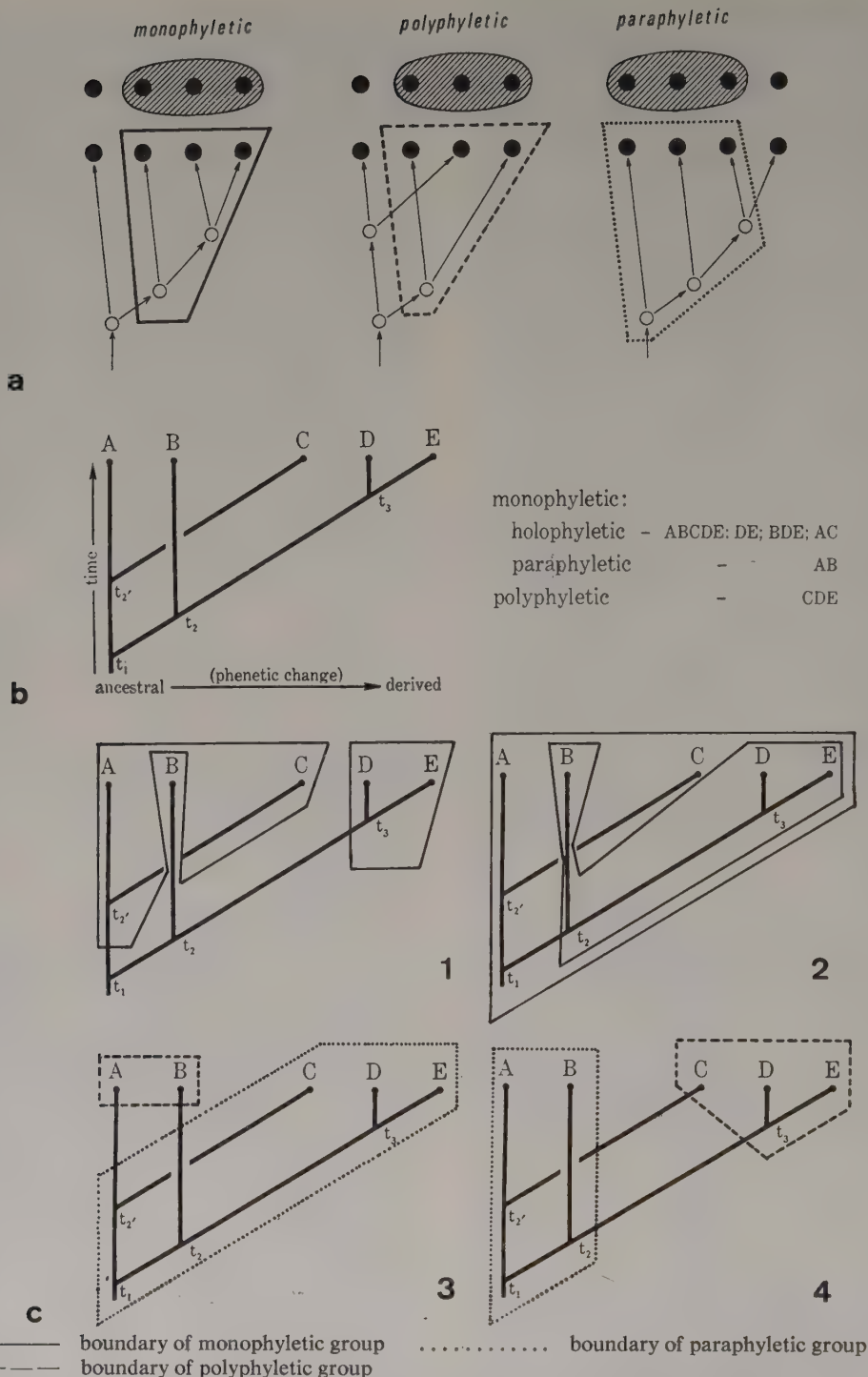


Fig. 1. — a. The actual extent of the monophyletic, polyphyletic and paraphyletic groups in Hennig's fig. 45 (1966) as delimited by Ashlock's definitions. (Modified from Hennig 1966). — b. Ashlock's fig. 2 (1971) illustrating the actual taxa of various types to be found in a particular species group. — c. Boundaries of some of the possible taxa of various type to be distinguished within the species group of b, using Ashlock's definitions. As can be readily appreciated from figs 3 and 4, the status of taxa AB and CDE is entirely dependent on the actual inclusion of stem-species.

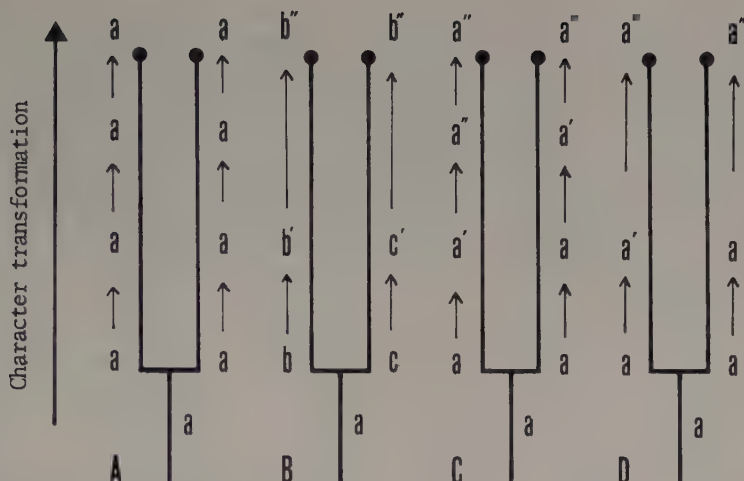


Fig. 2. Examples of identical character states in two taxa due to different types of evolutionary history, namely, A) homology; B) convergence; C) eu-parallelism; D) pseudo-parallelism. Identical denominations means phenetically identical character states.

structure. In practice it may prove difficult to separate between homologues and eu-parallelisms. *Pseudo-parallelism* (fig. 2, D) also involves homologous structures. However, these structures have had a different evolutionary history and have developed (quite substantial) differences before that part of the evolution started that led to the development of a similar secondary structure. The structure of the homologous wings of two not closely related insect groups can be considerably different and yet the end result of wing reduction in the two groups can be the same.

Evolutionary processes that provide "evolutionary evidences" are speciation, extinction and the transformation of gene pools.

Speciation takes place by transformation or the splitting of species. The *splitting* of species (cladogenesis) gives rise to *branching* of evolutionary lines. Speciation by *transformation* depends on such changes in the genome of an evolutionary line that the individuals living after the change are no longer potentially interbreeding with individuals living before the change; a sexually isolating mechanism has evolved. The second process is *extinction* (=negative persistence) which is terminated when all individuals of an evolutionary line are extinct. The third process is the *transformation of the gene pools* (anagenesis) by mutation, recombination and selection. Because these processes usually take place in different ways in different lines they give rise to *divergence* i.e. to an increasing difference in the genomes and

therefore in the phenotypes. But due to similar selection pressures on different lines, this process can also produce increasingly similar genomes and phenotypes, which leads to convergence or parallelism. Speciation is really only a special case of transformation of the genomes, namely the development of sexually-isolating mechanisms. Because these changes manifest themselves in a biologically very drastic way, as compared with the other gradually evolving phenetic differences, it is justifiable to treat speciation as a separate evolutionary process. Huxley (1958) has grouped the evolutionary processes into improvement (anagenesis), diversification (cladogenesis) and persistence (stasigenesis).

In accordance with the biological species concept and the view that speciation is a biological process, distinctions can be made between different types of cladogenesis (fig. 3). In the present discussion the most important types are the *dichotomous* and *polytomous branching* of evolutionary lines, with or without surviving stem-species.

What is "a true phylogenetic taxonomy"?

Hennig has termed his systematic theory and procedure as phylogenetic systematics. Adherents to evolutionary taxonomy (Mayr 1969: 70; Ashlock 1971: 68) argue that Hennig's taxonomy is not a real phylogenetic taxonomy because it is based on only one part of the evolutionary evidence, namely the genealogical

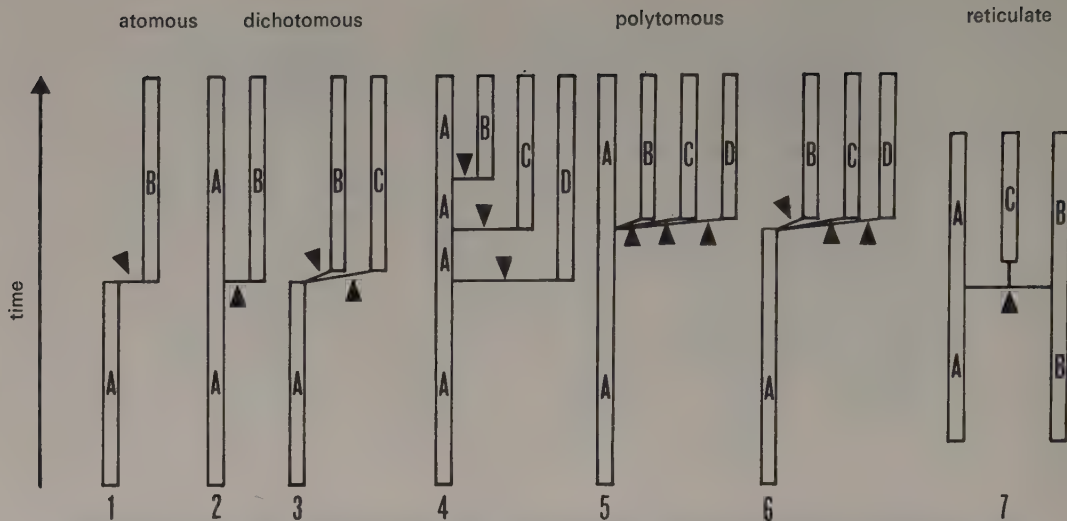


Fig. 3. The main types of speciation that are biologically possible, that is in accordance with the biological species concept and with a biologically correct view of speciation. — 1. Atomous speciation (transformation of species). — 2. Dichotomous speciation, with surviving stem-species. — 3. Ditto with simultaneous extinction of the stem-species. — 4. Polytomous speciation with surviving stem-species (=repeated dichotomous speciation from the same surviving stem-species). — 5. Polytomous speciation (radiation) with surviving stem-species. — 6. Polytomous speciation (radiation) with simultaneous extinction of the stem-species. — 7. Reticulate speciation. — A, B, C, D = different species. ▲ = speciation.

cladistic relationships between the taxa. They consequently refer to Hennig's school as *cladism* and restrict the term phylogenetic, or even "true phylogenetic" taxonomy, to the evolutionary school; considering it justified because they maintain that they use more kinds of evolutionary evidences. They have based their work on a relationship based on "inferred genetic similarity, as determined both by distance from branching points and subsequent rate of divergence" (Mayr 1969: 200).

There is no doubt that the cladism is a phylogenetic taxonomy in the above-mentioned sense (p. 9) because it is clearly based on the succession of events (at least some of them) in evolution. On the other hand it is doubtful if evolutionary taxonomy, any more than numerical (phenetic) taxonomy, can be termed a phylogenetic taxonomy because it is *not* based on a study of the kinds and successions of evolutionary events, but only on an evaluation of the sum of all preceding evolutionary events. Exceptions are only found when the study is based on series of dated fossils. A true phylogenetic taxonomy must therefore relate past evolutionary events to the time dimension, otherwise it is not based on the "history of evolution".

In accordance with Hennig and Brundin I will continue to refer to their cladism as phylogenetic taxonomy (cf. Kiriakoff 1966, who agrees that cladistic taxonomy cannot be correctly called phylogenetic). I will use "numerical taxonomy" and "evolutionary taxonomy" in the conventional sense (p. 7).

On the basic concepts of phylogenetic taxonomy

The most fundamental procedure of phylogenetic taxonomy is the "*reconstruction of the phylogeny*" i.e. to trace the history of evolution, as expressed by the sequences of branchings in the evolutionary lines. The result of this procedure can be represented in a cladogram, which can be used for constructing classifications and for explaining zoogeographical patterns etc.

Monophyly proved by synapomorphy

In the phylogenetic taxonomy as presented by Hennig (1966) and Brundin (1966) only complete monophyletic (holophyletic) taxa are accepted. When it is impossible to prove the monophyly of a taxon, it can not be accepted.

The monophyly of a taxon is proved by the presence of the same derived (apomorphic) characters in all members of the taxon, i.e. by *synapomorphy*. As all members of a monophyletic group (or taxon) must originate (by definition) from a single ancestral species (the stem-species), the presence of certain apomorphic characters in all the members is explained as the heritage from the common stem-species, which has acquired that particular apomorphic character. Because the stem-species of most recent taxa are not known, the presence of the apomorphic character cannot be directly demonstrated but only indirectly inferred. The reasoning behind this procedure is that it is more probable that the presence of an apomorphic character in many entities (individuals, species, genera etc.) is the result of heritage from a common ancestor rather than all entities developing the same character independently. If the latter has occurred the similarity is due to convergence or parallelism, not to synapomorphy. Because convergence and parallelism are very common in many organs that are subject to strong functional selection pressures, the evaluation of similar characters or character states is largely dependent on which evolutionary history of the character is demonstrated to be the most probable. The more special and complex a structure, the more probable is it that its presence in many groups is due to synapomorphy rather than to many independent evolutionary events, which by chance would have resulted in exactly the same complex structure. The situation is different when series of reduction are concerned; they usually seem to be the result of a similar selection pressure in different evolutionary lines.

Difficulties associated with parallelism

Unfortunately unique complex structures are rare in most lower taxa (families, genera etc.) while reduction series are frequent. It is often possible to trace the evolutionary trends of organs and to arrange the different states of the characters in *transformation series*, which show the succession in which the changes must have taken place. Even if this procedure is possible, it is not all that easy to show that a number of taxa, each showing a special character state in this series, have developed in a common evolutionary line in the same succession (fig. 4). The different character states may have developed independently by parallel evolution in different evolutionary lines, even

though they can be arranged in a common transformation series. This can be the case both for series where more complex structures are developed and, perhaps more commonly, in reduction series. Fig. 4 demonstrates an example of how drastic the derived phylogeny differs from the correct phylogeny if the character states arranged in a transformation series are treated as though they had developed in a single evolutionary line instead of along two parallel lines. To decide if case 1) or 2) in fig. 4 (or any other more complex case) is really present when recent taxa A—E with character states a—a' are studied, is not possible by the study of character a alone. The situation is even more difficult to analyze when the character states for additional characters can be arranged in straight transformation series, in spite of the fact that the evolution has taken place along two or more lines. Such situations lead to "*conflicting evidences*". For instance in the phylogeny of cyclorrhaphous Diptera the same reduction series for wing veins and abdominal sclerites have been used as synapomorphies in the analyses of many groups. Because these similar reductions have developed independently many times, they seem to be easily initiated and managed by functional selection pressure, and therefore it does not seem very convincing that the different stages of reduction in different taxa really show the succession in which these taxa have evolved.

The procedure of phylogenetic taxonomy

The procedure of phylogenetic taxonomy comprises 1) the reconstruction of the phylogeny and 2) the construction of the classification.

Reconstruction of the phylogeny

Phylogenetic taxonomy maintains that it is possible to reconstruct the phylogeny on the basis that all individuals descending from a common ancestor have a common heritage from that ancestor, and that it is possible to detect this heritage. Of special use are characters or character states that have developed during the evolution of the ancestor itself. The unique heritage displayed by these characters forms an *autapomorphy* for the ancestor and for the whole group its descendants form. When looking at the different individuals within this group the same characters form the synapomorphies which prove that each individual

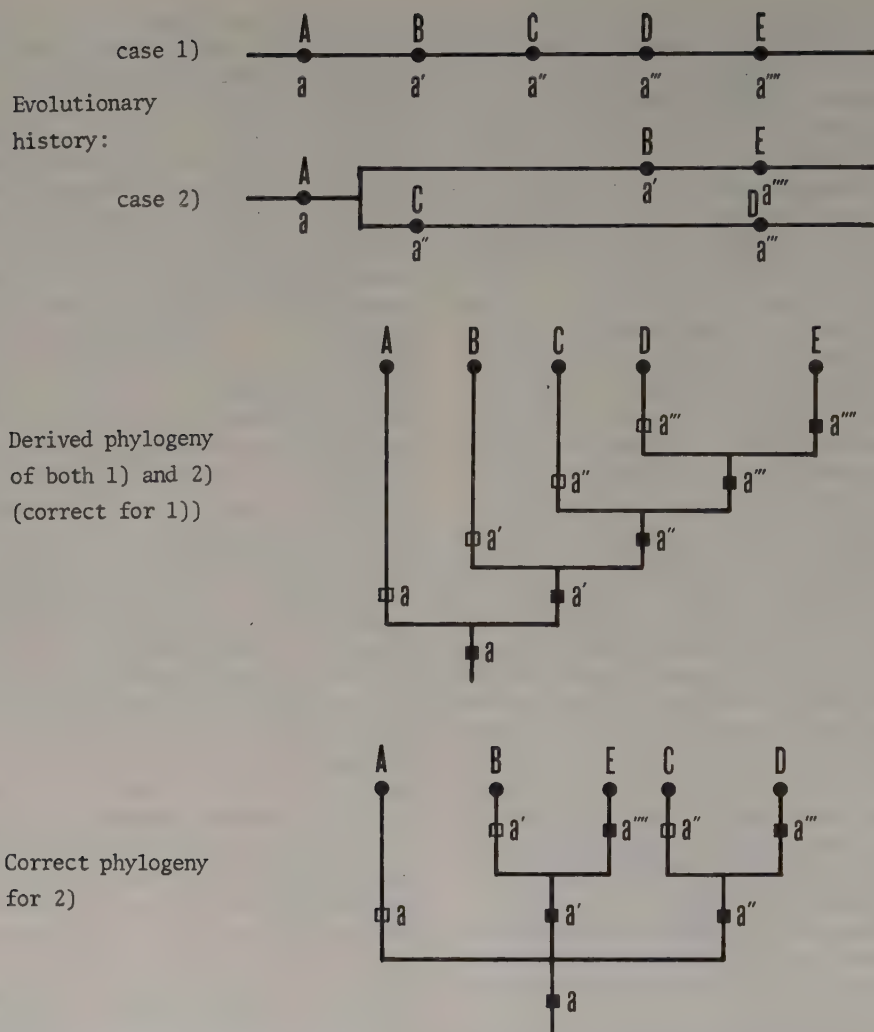


Fig. 4. Reconstruction of the phylogeny for case 1) and case 2) will both give the same result if in the recent species A—E the character states of character a can be arranged in the transformation series a—a'''. The derived phylogeny is correct only for case 1). — Transformation series for character a: a a' a'' a''' a'''. — Taxa with character a in any character state: A, B, C, D, E. — □ — plesiomorphous state, ■ — apomorphous state.

belongs to the group and that the individuals form a monophyletic group.

Phylogenetic analysis starts with a study of individuals. If there are some of these which share one or more special characteristics (characters) that are not present in the others, the former are considered to form a monophyletic group because their characters are more likely to be due to a common heritage, rather than to separate acquisition within many separate evolutionary lines. When several such monophyletic groups are formed it should be

possible to find special characters common to two or more of these primary groups. Similarly it is supposed that these characters show that such groups form a higher monophyletic group that has originated from a common ancestor. In this way the organisms are arranged in additional monophyletic groups of increasing magnitude and evolutionary age. In most cases it is not possible to directly prove that a special character is inherited from a common ancestor. The whole procedure is based on the possibility that a common character can be demonstrated

to be more probably the result of a common heritage rather than to many different evolutionary events. Furthermore, the more complex and special the structure, the less probable is it that it has evolved separately on several occasions, rather than it is the result of a single evolutionary process. The monophyletic groups are represented as points connected by lines to illustrate the pathways of evolution. In these schemes the characters used are indicated on the connecting lines.

It is basic for phylogenetic taxonomy that all recognized groups should be proved to be monophyletic, i.e. to originate from one stem-species (common ancestor), by the presence of synapomorphic characters. Where the monophyly of a group cannot be proved it should not be included in the phylogenetic system.

In phylogenetic taxonomy it is thus essential to find characters that can prove the monophyly of the group, i.e. characters that are in the same or more developed apomorphic character state in all individuals or taxa involved in the group. During evolution the various characters of the organism change. If one character changes during evolution it is different (is in different character states) at different times. Its actual characteristics at a particular time represent a special character state. The different character states following each other, when they are compared, are said to be plesiomorphous (generalized) or apomorphous (derived). These concepts refer only to a particular comparison. If one character state is compared with a later character state the earlier one is said to be *plesiomorphous* and the later one is *apomorphous*, even if the second state is less complex due to reduction. If the second (later) character state is compared with a still later third one, the second character state is plesiomorphous in relation to the third, which, in this comparison, is apomorphous. Thus the same character state can be either plesiomorphous or apomorphous according to whether it is compared with an earlier or later character state. The concepts of plesiomorphy and apomorphy are independent of the nature of the structures. Thus a later state is apomorphous irrespective of whether or not it is more complex or simpler than an earlier state. Because the plesiomorphous character state can be either more complex or more simple it is not possible to say directly which state, in a particular comparison, is plesiomorphous. Therefore another criterion must be used to determine which state is plesiomorphous. When

fossils are not available the only way to come to a decision is to study how the character is formed within a larger group of taxa belonging to the same or higher categories. If one of the character states in this special comparison is widely distributed, it is more probable that this state is plesiomorphous and that its presence in various taxa results from a common heritage rather than that it has developed independently in the same way in many different evolutionary lines. The decision about which character state is plesiomorphous is thus based on probability.

Having come to a conclusion about which character states are most plesiomorphous and which are the most apomorphous it is possible to construct a transformation series for this character and then to use the different character states in this transformation series in a scheme of argument. But this is not altogether without problems. It must first be proved that all character states used in the transformation series belong to the same evolutionary line. Due to special selection pressure the same plesiomorphous character state can develop in essentially the same way in different evolutionary lines. Thus character states obtained from more than one evolutionary line may have been used in the construction of the transformation series. Especially when reductions are concerned very similar character states arise in different lines as can be seen from the studies of *Diptera Schizophora* (Hennig 1958, Griffiths 1972). Repeatedly similar reduction series for bristles, wing veins, and abdominal sclerites are found in different groups. Thus in the construction of the phylogeny it is first necessary to decide which character state is the original (ground-plan condition), and then to show which character states really belong to the same evolutionary line.

In reconstructing the phylogeny there is also the problem of dichotomy (or non-dichotomy) in evolution. The application of the concepts of plesiomorphy and apomorphy means that it is only possible to compare two items (two taxa) at each comparison. This method is completely adequate when there has been a dichotomy in the evolution. It has been claimed (Brundin 1966:17) that dichotomy is the universal way of evolution. If polytomy is present there are complications. When the phylogenetic method fails in species-rich groups this is explained as being due a lack of suitable characters or to an insufficient knowledge of the group, rather than to the presence of poly-

tomy. On the other hand, the method has worked well in old groups, and this has been taken as proof for the universal presence of dichotomy in evolution. Dichotomy in old groups can in fact be due to a secondary dichotomy, resulting from extinction. Even if evolution has been substantially polytomous, the accumulated extinctions will result in an increasing dichotomy among the remaining branches and this will make the group increasingly more adapted to phylogenetic taxonomy. However, it is questionable if the reconstruction of the phylogeny of surviving old rest groups really depicts the true pathways of evolution.

The biological species concept and the biologically influenced view of speciation does not presuppose a dichotomy in evolution. On the contrary, it leaves the possibility open for other types of speciation. In a situation where one species has split into three different species there will be, according to phylogenetic analysis, an apomorphy that is present in all three species and which proves the monophyly of the group.

Schlee (1971) has discussed polytomous speciation and the problem associated with surviving stem-species. Schlee admits that such situations are possible and that they result in polytomous groupings in phylogenetic analysis. To avoid the problem of polytomy and to make phylogenetic taxonomy universally applicable, Hennig (1966) has introduced a particular view of the species and speciation. The species is defined as the evolutionary line between two branching points. This means that if the stem-species splits off one branch which develops into a new species, the remaining unchanged population of the stem-species is to be regarded as another new species, in spite of the fact that it is both phenetically and genetically unchanged. The surviving stem-species may branch off another new species without changing its specific identity, and so on. Phylogenetic taxonomy places great emphasis on the time dimension and proponents maintain that it is impossible or very unlikely that two or more species are branched off at exactly the same time, not just because speciation usually takes time. Keeping this view, and using the new species concept, it will be quite possible to argue that evolution is strictly dichotomous. This reasoning, together with the species definition, is in fact contradictory to one of the most fundamental demands of phylogenetic taxonomy, namely that all taxa taken into

consideration must be proved by the existence of apomorphous character states. Therefore, the unchanged surviving stem-species cannot be proved to be a separate species because it has not evolved any apomorphous characters in relation to itself before branching-off. To avoid this dilemma each phylogenetic analysis must be restricted to only one special time horizon and thus the true status of long existent species during earlier periods of time can be disregarded. The restriction of the phylogenetic analysis to include only one time horizon is obviously a means to avoid the problem with polytomy in evolution and with the surviving stem-species. If there is a polytomous evolution in nature can the reconstruction of the phylogeny, by means of the secondary dichotomy, be a reconstruction in agreement with the evolutionary history?

Theoretically, at least, it is highly probable that the result will be distorted by the common occurrence of parallel and convergent evolution, associated with partial extinction.

When a stem-species, A (in the biological sense), splits polytomously into evolutionary lines, it results in the formation of species B, C, D, E, F, and G (fig. 5a). Because parallel evolution is common to the group, B and D are both characterized by the apomorphous character state *e*. If extinction allows only species B, D and G to remain, the derived phylogeny will be like that in figure 5b. But this dichotomy is incorrect. Unfortunately such incorrectness cannot be traced when only recent material is available. Situations similar to this could be expected to be common in old relict groups when the phylogenetic analysis is carried out mostly on reduction series or other strongly adaptive characters. The fact that the derived phylogenesis is incorrect may have less importance when it is used as a basis for constructing classifications alone. But for purposes of biogeographic arguments, which presupposes a correct phylogeny, such shortcomings of the phylogenetic method are unacceptable.

Construction of the classification

Proponents of phylogentic taxonomy maintain that the reconstructed phylogeny should be the direct basis for the classification. This is reasonable, provided the reconstructed phylogeny is correct and faithfully depicts evolutionary history. Further essential principles are that all taxa should be complete monophyletic

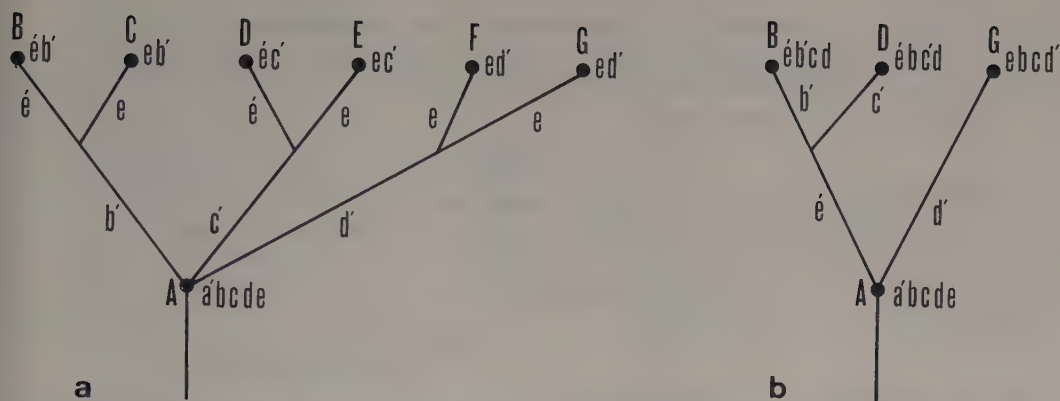


Fig. 5. Example illustrating how a polytomous evolutionary line (a) is transformed into an incorrect dichotomous evolutionary line (b) due to presence of parallel or convergent character transformation (e—é) and subsequent extinction (of taxa C, E, F). A—G, species; a—e, plesiomorphous character states; á—é, apomorphous character states of respective character. The character states are only partly marked out. Note the change in relative age for the character transformations e—é, b—b' and c—c'.

(=holophyletic) groups and that sister groups should be given the same status so as to belong to the same category. However, this will not completely remove the subjective moment from the process of classification, because the existing large number of branchings and sister-groups will make it untenable to assign a category to every level of branching, or to name every sister-group. Also the phylogenetic classification must therefore be subject to substantial non-objective rules derived from general agreement and which are largely influenced by considerations of usefulness etc.

General and phylogenetic characteristics of Chloropidae

The systematic position of Chloropidae within Diptera

According to the most recent study of the phylogenetic relations within Diptera Brachycera (flies) (Griffiths 1972) the position of Chloropidae is as follows:

Order Diptera

Suborder Brachycera

Superphalanx Eremoneura

Phalanx Cyclorrhapha

Subphalanx Atriata

Infraphalanx Schizophora

Superfamily Muscoidea

Prefamily Tephritoinea

Family-group Chloropidae

Family Chloropidae

The holometabolous insect order Diptera has generally been divided into the two suborders, Nematocera (midges, mosquitoes, gnats, etc.) and Brachycera (flies) with the two subgroups Orthorrhapha and Cyclorrhapha, or into the three suborders Nematocera, Brachycera, and Cyclorrhapha. Steyskal (1974) has summarized the most recent proposals leading to a phylogenetic classification of the primary taxa of Diptera. It was stressed that many of these proposals are tentative or put forward basically as a working hypothesis for future research. In this new classification Diptera is divided into the two suborders Tipulata (including only Tipulidae and Trichoceridae) and Psychodata (including all other nematoceros and brachyceros families). Psychodata contains five infraorders: Psychodomorpha, Blepharicerimorpha, Culicomorpha and Bibionomorpha for the nematoceros families and Muscomorpha for all the brachyceros families. Muscomorpha has three subgroups: Homodactyla (Stratiomyidae, Tabanidae, and related families), Heterodactyla (Bombyliidae, Asilidae, Empididae, Dolichopodidae and related families), while all families of higher flies are included in Cyclorrhapha (Tab. 1).

Griffiths (1972) has made a comprehensive study of the phylogeny of the families belonging to the phalanx Cyclorrhapha (cf. Tab. 2). According to Griffiths, Cyclorrhapha is characterized by the following four apomorphous conditions:

- (1) Larval head capsule reduced; individual parts of cephalic and pharyngeal skeleton fused into

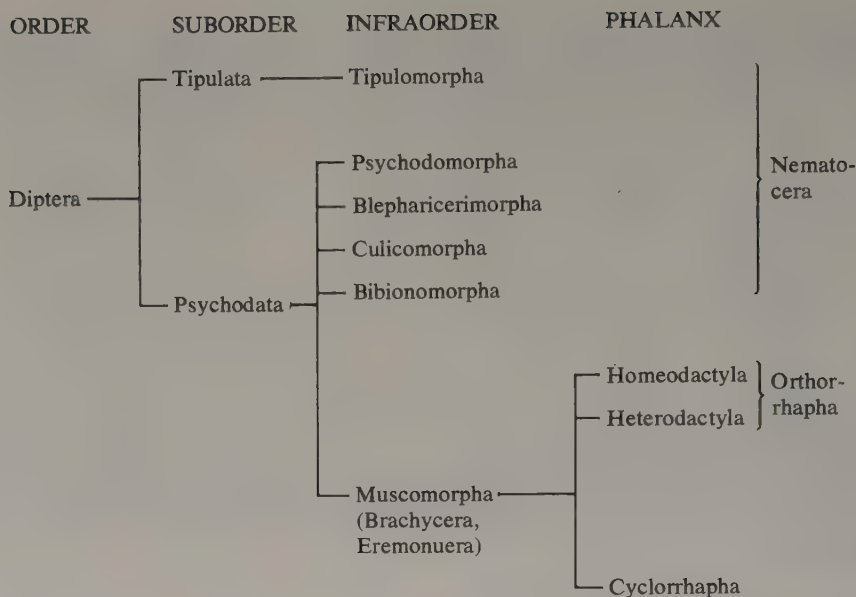


Table 1. Phylogeny of the main groups of the order Diptera according to Steyskal (1974).

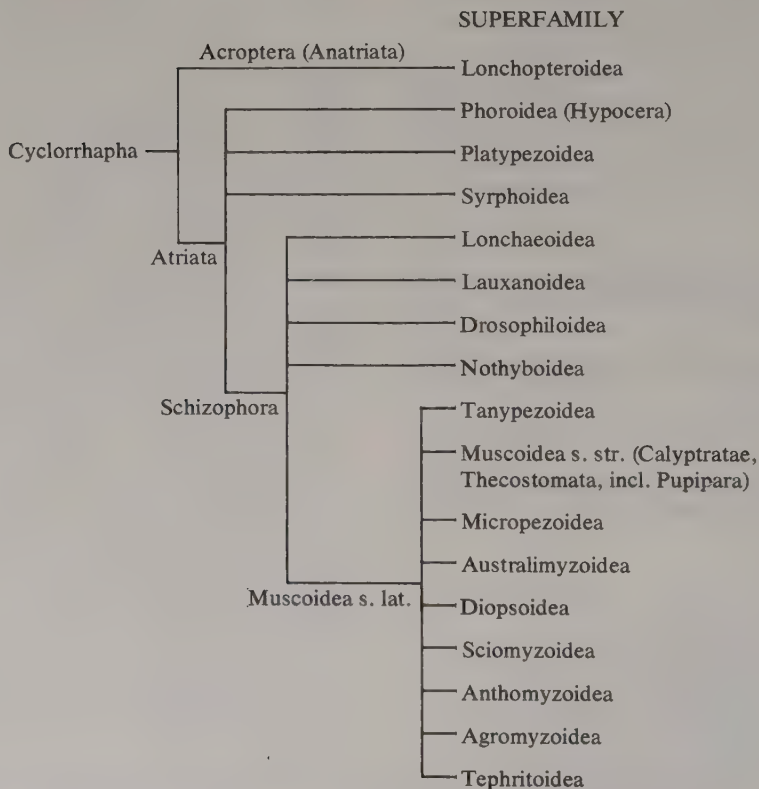


Table 2. Phylogeny of the main groups of Cyclorrhapha according to Steyskal (1974).

uniform 'cephalopharyngeal skeleton'; pupa enclosed within puparium formed by contraction and hardening of integument of 3rd larval instar.

- (2) Radial sector two-branched; r_{4+5} not forked.
- (3) Hypopygium (δ) rotated to inverse position within puparium, then rotated through further 180° to circumverse position soon after emergence; 8th abdominal segment rotated through half angle of hypopygial rotation (through 90° within the puparium, then through further 90° to inverse position after emergence).
- (4) 8th tergum (δ) (normally in ventral position in mature adult) reduced to narrow band.

Griffiths retains the two well-known subgroups of the Cyclorrhapha: the Acroptera (= Anatriata) with the single family Lonchopteridae, and the Atriata, grouped into the Hypocera (Phoridae), Platypezidea, Syrphidea and Schizophora. The difference between these two subgroups is the absence resp. presence of the so-called atrium in the larval head.

Schizophora (cf. Tab. 3) was characterized by the following seven apomorphous conditions:

- (1) Ptilinum present and so is associated temporary musculature in the first four abdominal segments.
- (2) Vein m_{1+2} not forked.
- (3) Anal cell shortened.
- (4) Two pairs of vertical bristles (v_{ti} and v_{te}) present.
- (5) Hypopygium (δ) irreversibly rotated through 360° to circumversum position within puparium.
- (6) First abdominal segment with 'adventitious suture' extending posterodorsally from its anterior margin.
- (7) Ejaculatory apodeme (δ) free from body wall.

The numerous families of Schizophora were grouped into five superfamilies: Lonchaeoidea, Lauxanoidea, Drosophiloidea, Nothyboidea, and Muscoidea. The most striking differences in this arrangement, as compared with earlier classifications (for instance Hennig 1948, 1958), are that Archischiza (Conopidae) is incorporated into Schizophora (Muscoidea s. lat., Muscaria) and that the two family-groups Acalyptratae and Calyptratae (Thecostomata) are completely abandoned. The families of Calyptratae (incl. Pupipara) are included, together with most of the former Acalyptratae families, in the superfamily Muscoidea, which in turn is grouped into nine prefamilies. Table 3 shows Steyskal's (1974) modification of the classification of Cyclorrhapha, in which the

infraphalangi, superfamilies and prefamilies of Griffiths all are ranked as superfamilies.

According to Griffiths (1972) Muscoidea s. lat. is characterized by five apomorphous character states:

- (1) 7th abdominal sternum (δ) strongly asymmetrical, extending dorsally on left side until becoming fused or contiguous at its dorsal extremity with the inverted 8th sternum.
- (2) 7th tergum (δ) asymmetrically reduced to small vestige situated lateroventrally on right side: 7th right spiracle displaced toward centre-line.
- (3) 6th sternum (δ) asymmetrical, more strongly developed on left side where it extends towards the 7th sternum.
- (4) Hypandrium (δ) linked to anterior margin of inverted 8th sternum by unpaired muscle on left side (*musculus hypandriotergalis*).
- (5) Aedeagus (δ) articulated with aedeagal apodeme, swung through wide arc from anteriorly directed rest position to copulatory position, with basal phallosophore and at least a pair of lateral sclerites (paraphalli) differentiated in its walls.

Muscoidea was by Griffiths grouped into nine prefamilies (by Steyskal ranked as superfamilies) corresponding to the superfamilies of the superfamily-group Muscoidea s. lat. in Tab. 3.

The prefamily Tephritoinea (= superfamily Tephritoidea) was characterized by four apomorphous character states:

- (1) Aedeagus (δ) extremely elongate, flexible, coiled when at rest, extended by pressure of body fluid, bearing numerous fine cuticular processes ('pubescence').
- (2) 7th and 8th abdominal segments (δ), elongate, forming slender retractile ovipositor: 8th sternum divided into paired longitudinal sclerites.
- (3) '*Musculus hypandriotergalis*' lost (?).
- (4) Costa broken at end of subcosta (or near end of r_1 if the subcosta has been reduced).

Of the fourteen recognized families within Tephritoinea Griffiths grouped four (Chloropidae, Acartophthalmidae, Carnidae, Milichidae) into the Chloropidae family group, characterized by the following apomorphous features:

- (1) Two rudimentary spermathecae (δ); spermathecal ducts long and fine.
- (2) Aedeagal apodeme (δ) free anteriorly, but becoming fused with body wall posteriorly so that a sclerotized area is formed anterior to the aedeagus base between the hypandrial arms.
- (3) 6th tergum (δ) reduced.
- (4) 8th tergum vestige (δ) lost.

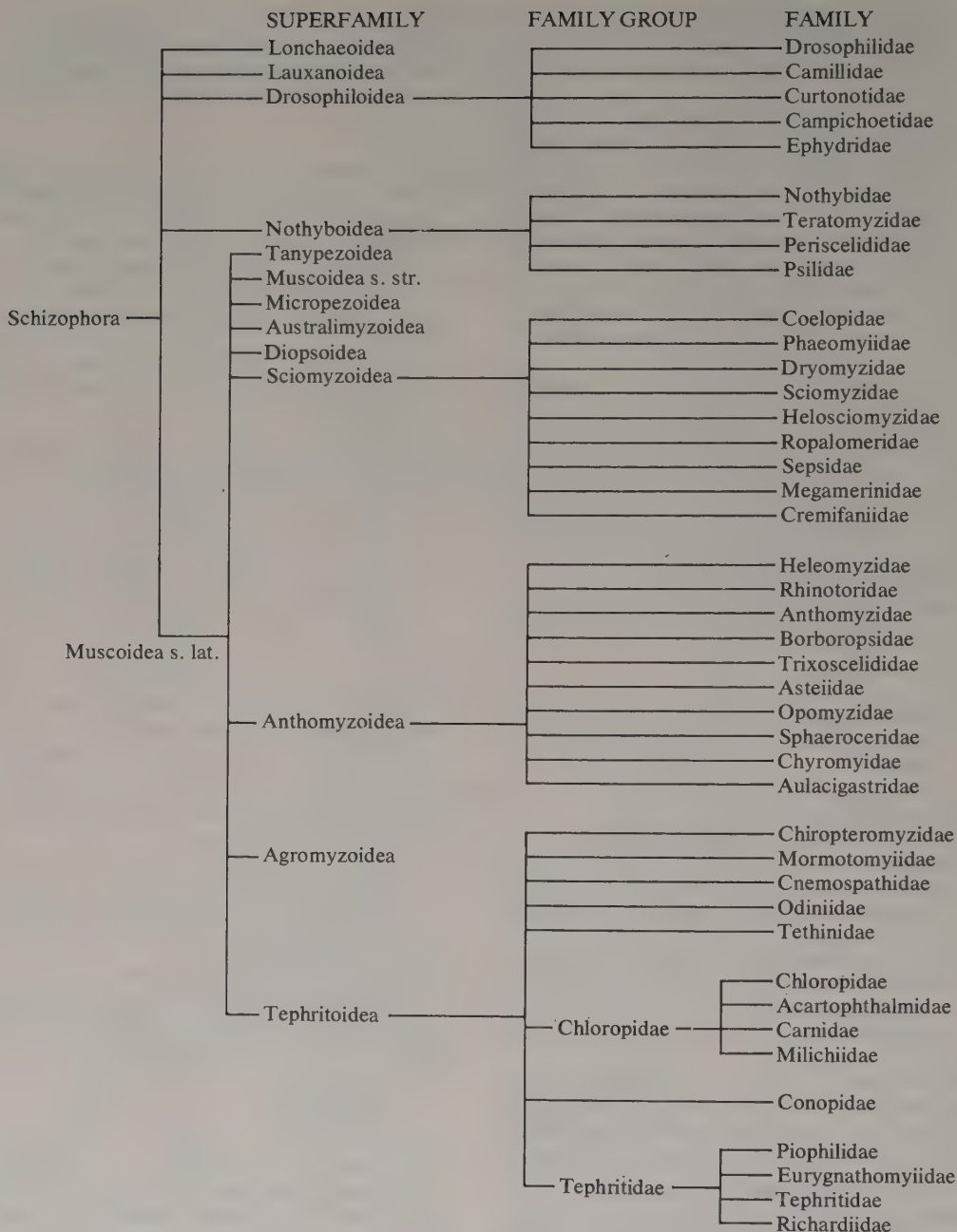


Table 3. The phylogeny of Schizophora, compiled from Griffiths (1972) and Steyskal (1974). Only taxa of special interest for the discussion of the phylogenetic relations of Chloropidae are listed.

(5) Anal vein shortened, not reaching wing margin.

Griffiths sums up the apomorphous characters of the family Chloropidae as follows:

- (1) Maxillary lacinia ('Galea') rudimentary.
- (2) Postverticals convergent.

(3) Ocellar plate large.

(4) Propleuron margined at anterior edge of its lateral exposure.

(5) Subcosta developed as distinct vein only at its base, from there to costal break visible at most as fold.

(6) Anal cell not evident, with veins forming its

posterior and distal boundaries (sections of 1a and cu_{1b}) absent or largely reduced to folds (at most with basal stub of 1a sclerotized); anal vein lost.

- (7) Base of m₄ (= 'tb, lower cross-vein) lost.
- (8) 6th tergum (♂) completely lost.
- (9) 7th tergum vestige (♂) lost.
- (10) Aedeagus (♂) much reduced.
- (11) 7th tergum (♀) divided along centre-line of dorsum; 7th sternum small.

The proper place of Chloropidae within Diptera cannot be discussed in detail here but some comments upon the system presented by Griffiths (1972) and outlined above will be given. There seems to be no doubt that Chloropidae belongs to Muscoidea s. lat. in Schizophora.

The inclusion of Chloropidae in Tephritoidea rests on a rather weak basis and mainly on the assumption that the Chloropidae family group is monophyletic. Griffiths presented four apomorphic characters for Tephritoidea. The first character, aedeagus extremely long and pubescent, does not apply to Chloropidae. The second character is not specific for Tephritoidea; the long retractile ovipositor is also present elsewhere (in Muscoidea s. str., and others) and so is the divided S₈ (e.g. in Anthomyzoidea). The validity of the third character, *Musculus hypandrotergalis* lost, is not fully proved. The fourth character, costa broken at end of subcosta, is so widely distributed among Schizophora that it provides only a very weak support for the view of the monophyly of Tephritoidea.

Five apomorphic characters were presented as proof for the monophyly of the Chloropidae family group. The first character, the presence of two rudimentary spermathecae and long spermathecal ducts, has so far been demonstrated only for Chloropidae and Milichiidae, but the spermathecae are reduced in all four families; a feature which is not all that common among other families. The second character, the aedeagal apodeme (phallapodeme) being fused with the body wall anterior of the aedeagus and between the hypandrial arms, are certainly present in the four families but, as Griffiths stated (1972: 38), this is a common condition among Schizophora. A more specific feature for the Chloropidae family group is possibly the fact that the body wall between this anterior fusion and the base of the aedeagus is developed into a sclerotized plate, the phallapodemic sclerite (ph s). This sclerite is present between the hypandrial arms and between the pregonites. Characters three to five

are really no more than common reduction states within widespread reduction series.

Acartophthalmidae has several features that places it apart from the other three families in the family group, e.g. divergent *pvt*, no *if*, three strong, recurved *orb*, complete, free sc. Other features which separate it from the Chloropidae include the costal break near the humeral cross-vein, no costal break at the tip of sc, complete posterior basal cell, complete anal cell, and a distinct anal vein. The more obvious similarities with Chloropidae are present in the male genitalia even though differences are also found there (long, pubescent distiphallus, reduction of cerci). Griffiths listed seven apomorphic characters for this family. Some of them (Nos 1, 3, 6, and 7) belong to the large group of common, highly adaptive characters that are so frequently used in phylogenetic studies of Schizophora. Characters 2 (7th abdominal spiracles lost in both sexes) and 5 (cerci reduced) are more special. The importance of character 4 (sternites 7 and 8 (♂) fully fused, forming an almost symmetrical pregenital sclerite with which sternum 6 is joined on both sides) is more questionable. It is correct that a ventral sclerite is fused with a dorsal one. But is the dorsal sclerite really S₈ + S₇?

In *Acartophthalmus nigrinus* (Zetterstedt) the ventral sclerite has two symmetrically placed *sensilla tricoidea* that indicates that it most probably is S₆. In *A. bicolor* Oldenburg (fig. 6 B) there is only one sensillum near the left side and another at the junction of S₆ with the dorsal sclerite. On the left side of the anterior wall of the genital pouch there is a sclerite which is more distinct in *A. bicolor* than in *A. nigrinus*. In *A. nigrinus* it bears two distinct *sensilla trichodea* close together. In *A. bicolor* there is only one distinct sensillum within this sclerite. If this sclerite is S₇ it is not fused with S₈ in a dorsal position and the genital pattern would be more like that of *Lasiopleura* as interpreted by Griffiths. According to Griffiths sternite 5 is lost in *Lasiopleura*. My interpretation is that the dorsal sclerite is S₇₊₈ also in *Lasiopleura* and other Siphonellopsinae. Sternite 6 in Griffiths' interpretation would then be S₅ and sternite 7 would be S₆ (cf. figs 21, 22). In *Acartophthalmus* the phallapodemic sclerite is not fused with the hypandrium, as was stated by Griffiths (1972: 234), but only via membranes linked anteriorly to the hypandrium and laterally to the discrete pregonites (fig. 6 A). In this respect both

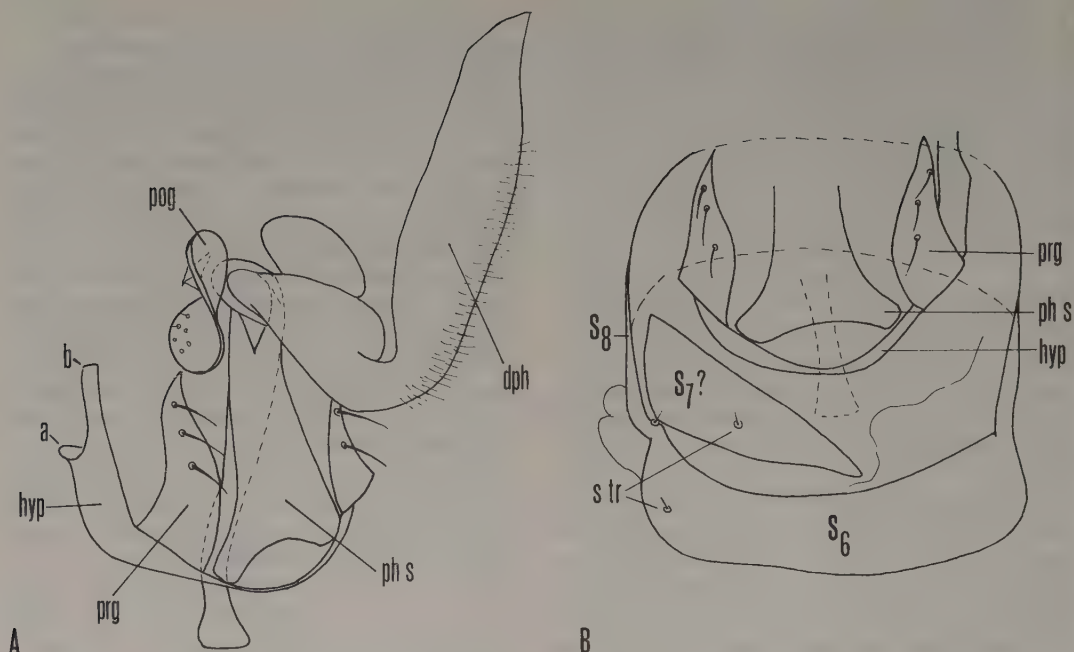


Fig. 6. *Acartophthalmus bicolor* Oldenburg, parts of male genitalia. — A. Lateroventral view; a — articulation with epandrium, b — articulation with ventral epandrial sclerite. — B. Ventral view.

A. bicolor and *A. nigrinus* are alike, and close to the ground-plan condition of Chloropidae.

The family Carnidae was characterized by Griffiths as having eight apomorphous characters. Characters 1 (mentum enlarged, enclosing sides of haustellum), 5 (see below) and 7 (cerci (♀) fused to form stylus-like structure) seem to be most important. The Carnidae differs from Chloropidae in having incurved *ori*, costal break near humeral cross-vein, strong bristles in one row on the broad jowls and a long, pubescent distiphallus and angrees in having non-divergent *pvt*, 3 outcurved *ors* (as *Lasiopleura*), distinct frontal triangle, distinct facial carina, reduced *sc*, costal break at tip of *sc*, and reduced *t_b*. There are no distinct *if*, except perhaps for the central, procurved pair of bristles near the fore margin of the frons, which resemble those in the same position in species of Siphonellopsinae. The male genital region is characterized by a special sclerite in front of the hypandrium (Griffiths' character No. 5; interpreted by him as *T₇*) and three spiracles on the left side and one on the right. The phallapodemic sclerite is not directly fused with the hypandrium but in some species fused

with it laterally via the pregonites. The epandrium is rather different in different species of *Meoneura*, ranging from a simple structure with simple surstyli and reduced cerci to a complex structure with discrete cerci, bifid surstyli and the ventral epandrial sclerite developed into long processes bearing tufts of very long bristles (as in *M. neottiophilum* Collin).

Griffiths listed 12 apomorphous characters for Milichiidae. Only the first one (maxillary lacinia reduced) seems to be of more significance, all the others belonging to the apomorphies widespread within Schizophora. Milichiidae has many features in common with the ground-plan condition of Chloropidae, such as reduction of maxillary lacinia, convergent *pvt*, 3 outcurved *ors*, distinct frontal triangle, distinct *if*, distinct facial carina, reduced *sc*, and costal break at tip of *sc*. The differences are obvious: costal break at humeral cross-vein, distinct *t_b*, distinct anal cell, and incurved *ori*. Griffiths stated that the phallapodemic sclerite is fused with the hypandrial arms. In *Madiza glabra* Fallén this sclerite is fused with the bases of the pregonites and these are united with the free anterior ends of the hypandrial

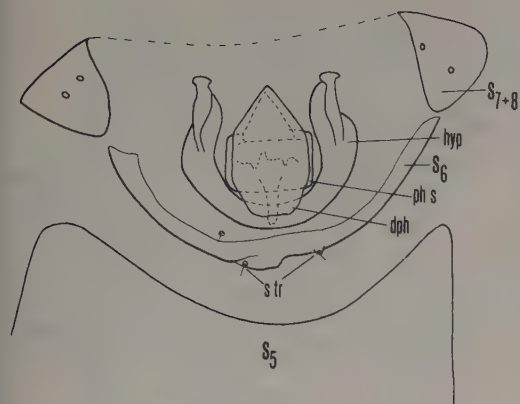


Fig. 7. *Phyllomyza formicae* Schmitz, parts of male genitalia, ventral view.

arms; the free ends of which seem to have developed by reduction of the anterior median part of the hypandrial arch. In *Phyllomyza formicae* Schmitz (fig. 7) the hypandrium is complete but neither the phallopodemic sclerite nor the pregonites are fused with it. Anterior of the hypandrium there is a narrow sclerite with two *sensilla trichodea* near the median line, and between it and the hypandrium, slightly to the left, another *sensillum trichodeum*. This sclerite most probably is S_6 and the arrangement comes close to that of *Acarotophthalmus*.

It is evident that there are great differences within the families of Schizophora and also within the families of the Chloropidae family group when certain important character complexes are concerned, especially within the male genitalia. Therefore, great caution must be taken when existing similarities are used as synapomorphies to prove the monophyly of the taxa. Thus the asymmetry caused by the rotation of the hypopygium and the subsequent reductions restoring the symmetry have brought about many similar transformation series in different evolutionary lines. Also the value of many wing characters (eg. costal breaks, reductions of sc , t_b , anal cell, and anal vein) and the chaetotaxy of head and thorax is very questionable when these characters are used to demonstrate the relationships between families and higher taxa. The present system of Schizophora (Griffiths 1972) implies that these characters are heavily influenced by convergence and parallel evolution.

General description and explanation of terminology

Imago

Head (figs 8—9). The *contour of the head* is rather different in different genera and has been widely used as a key character to separate the genera. In lateral view it is usually rounded or square and the frons and vibrissal angle project beyond the level of the eyes to the same extent (fig. 8A). In many cases, however, the frons or vibrissal angle project distinctly, sometimes very much, beyond the eyes (figs 43 and 85).

As is typical for Schizophora the chloropids have a well-developed *ptilinum*. The *ptilinal suture* is sometimes rather incompletely closed.

The *frons* is of the holometope type. It is broad and slightly sclerotized, so that the heads of dry specimens are often deformed. The *frontal triangle* (ocellar triangle) is usually strongly sclerotized and distinct. Sometimes it is so large that it covers the whole frons. The shape, colour, sculpture and pilosity of the frontal triangle have considerable taxonomic value. The bristles of the head are sometimes quite indistinct. Most of those mentioned below can usually be distinguished though they are often small. The *frontal bristles* (*fr*) are more or less numerous on the frons. Along the margins of the frontal triangle and curved up over it are the *interfrontal bristles* (*if*).

The bristles arranged in rows or evenly distributed on the surface of the frontal triangle are also interpreted as interfrontal bristles. Along each eye margin there are one or more *orbital bristles* (*orb*). They are recurved (reclinate), outcurved or procurved (proclinate). They cannot, as a rule, be classified as *upper fronto-orbital bristles* (*ors*) or *lower fronto-orbital bristles* (*ori*) and they are here simply called orbitals (*orb*). Their arrangement in some species of the subfamily Siphonellopsinae indicates that they (at least the more distinct ones) are upper fronto-orbital bristles. On the frontal triangle there are three ocelli on the *ocellar callus* and the proclinate or reclinate, convergent or divergent *ocellar bristles* (*oc*). On the vertex there are the outcurved *outer vertical bristles* (*vte*), the incurved *inner vertical bristles* (*vti*) and, in the middle, behind the ocelli, the *postvertical bristles* (*pvt*). Below the latter there is a defined part of the occiput, the *occipital field* (*occ*), which often has a darker colour.

The compound eye is large, circular or oval

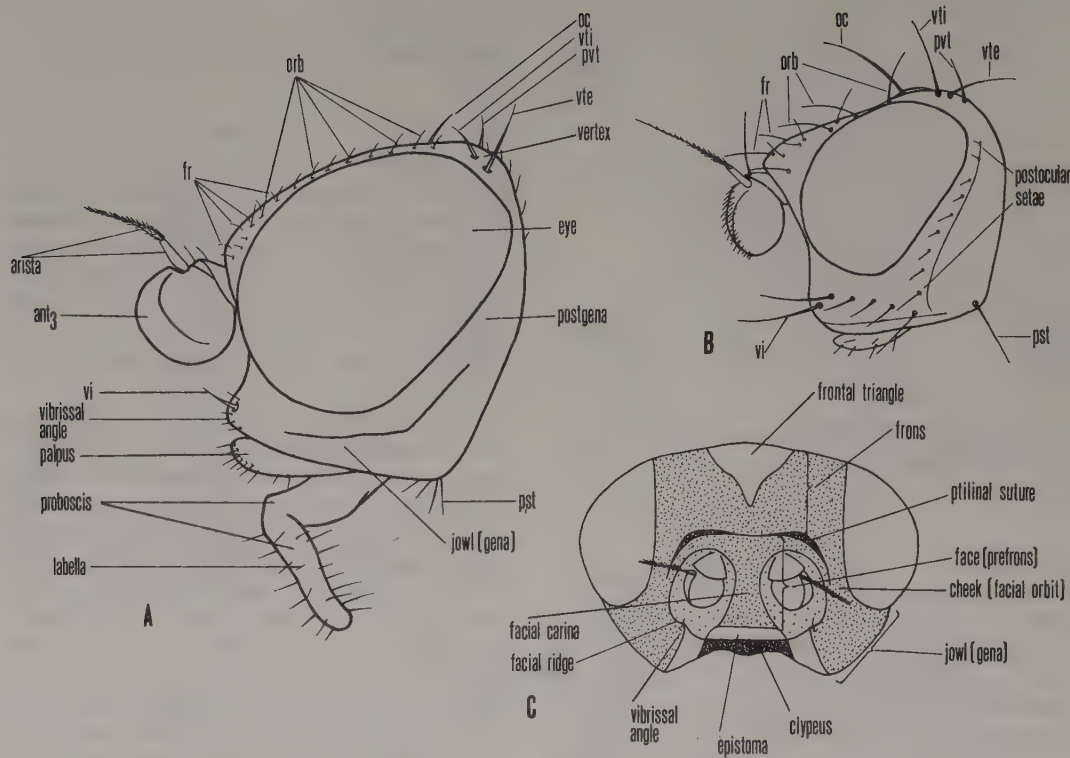


Fig. 8. — A. Head of Oscinellinae species in lateral view (*Calamoncosis* sp.). — B. Head of Siphonellopsinae species in lateral view (*Lasiopleura longepilosa* Strobl). — C. Head of Oscinellinae species in anterior view (*Lipara lucens* Meigen, bristles and hairs omitted).

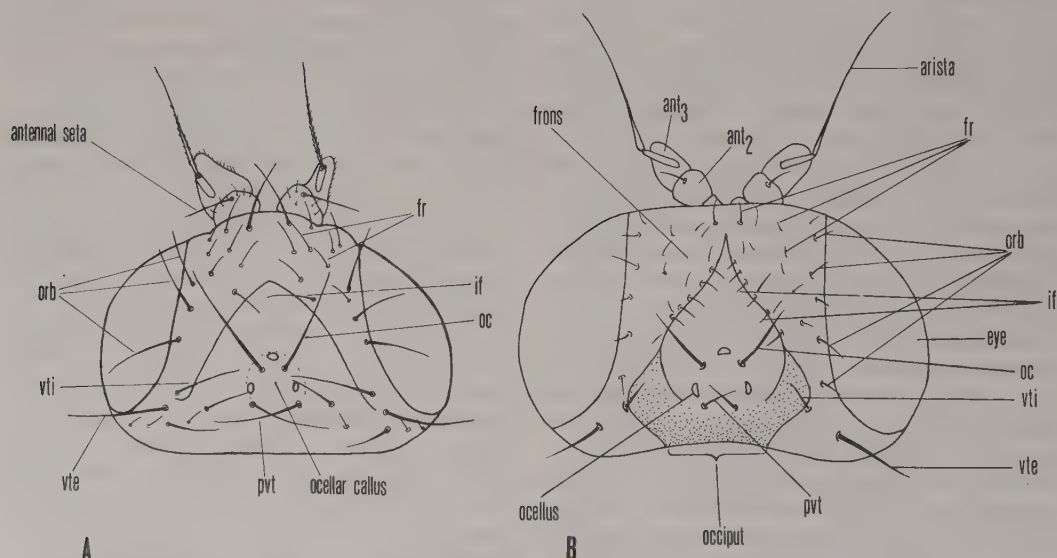


Fig. 9. Head, dorsal view. — A. Siphonellopsinae (*Lasiopleura longepilosa* Strobl). — B. Chloropinae (*Pseudopachychaeta* sp.).

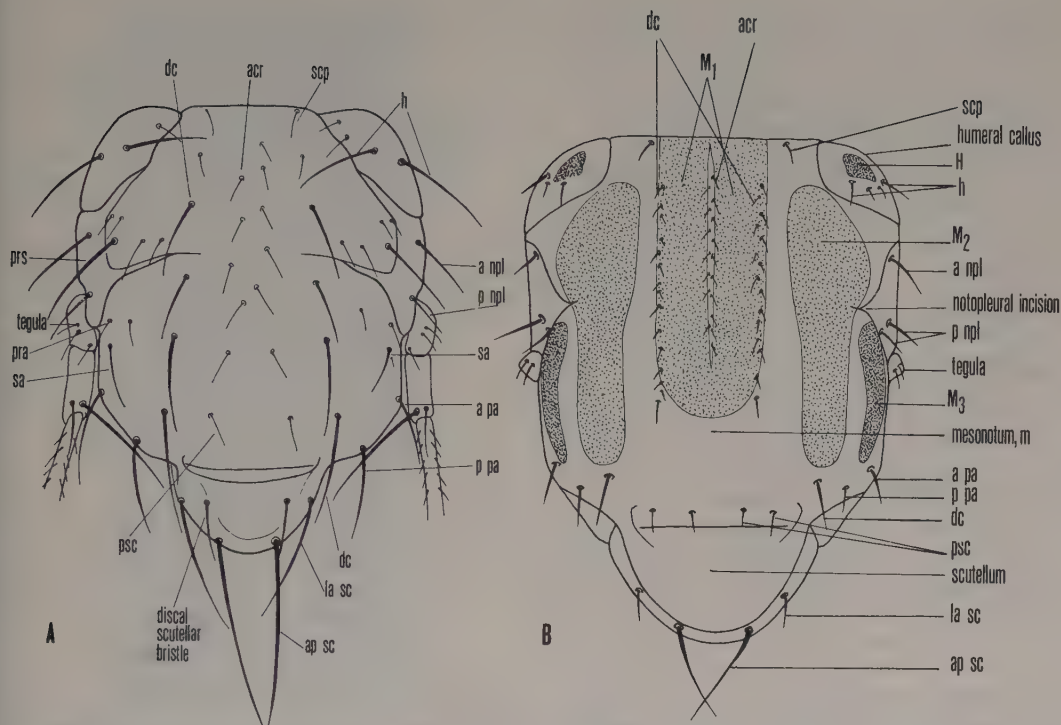


Fig. 10. Thorax, dorsal view. — A. Siphonellopsinae (*Lasiopleura longepilosa* Strobl). — B. Chloropinae (*Lasiosina* sp.).

with vertical, horizontal or diagonal long axis. It can be hairy or naked. Below the eye is the *jowl* (*gena*) the width of which has been used as a distinguishing character. The jowl bears the *peristomal bristles* (*pst*) and its broader hind part, the *postgena*, is sometimes separated by a low carina. The posterior surface of the postgena is sometimes flat and slides against a corresponding surface on the propleuron. The lower anterior corner of the jowl constitutes the *vibrissal angle* (*vi*) with the *vibrissal bristle* (*vi*). Between the face and the anterior margin of the eye is the *cheek* (facial orbit). The area below the ptilinal suture and delimited laterally by the facial ridges is the *face* (prefrons). Above the insertion of the antennae there is often a small triangular sclerite, the *lunule*, which sometimes passes over into the *facial carina* and down to the *epistoma* (epistomal field). The epistoma is the undermost part of the face just above the clypeus. The antenna comprizes three antennal segments. The *first antennal segment* (*ant*₁) is in most species quite small and covered by the *second antennal segment* (*ant*₂) which is usually short but sometimes rather long (fig. 29). The *third antennal*

segment (*ant*₃) shows great diversity: rounded, elongate, trapezoid, etc. The *arista* consists of three segments but only two are usually distinct. It is slender or broad and flattened, nearly bare, pubescent or thickly pubescent. A few cases of pectinate arista are known (fig. 92).

The proboscis is of the normal haplostomate type (Frey 1921); soft and short but not uncommonly it is more sclerotized and lengthened with long labella. In the latter case the vibrissal angle is produced. The *palpi* are of medium size, slightly upcurved, and circular in cross-section. They have short bristles. Anteriorly, at the base of the proboscis, there is the *clypeus*. It is usually black. The *labella* are intersected by three pairs of *pseudotracheae*.

The head capsule and mouthparts of the genus *Thaumatomyia* (*Chloropisca*) have been described by Peterson (1916); those of the genus *Chlorops* by Frew (1923). Graham-Smith (1930) has described the anatomy of the proboscis of *Hippelates pusio* Loew.

Thorax (figs 10—11). The thorax is usually short and broad with a rather convex mesonotum, sometimes it is long and slender and flat-

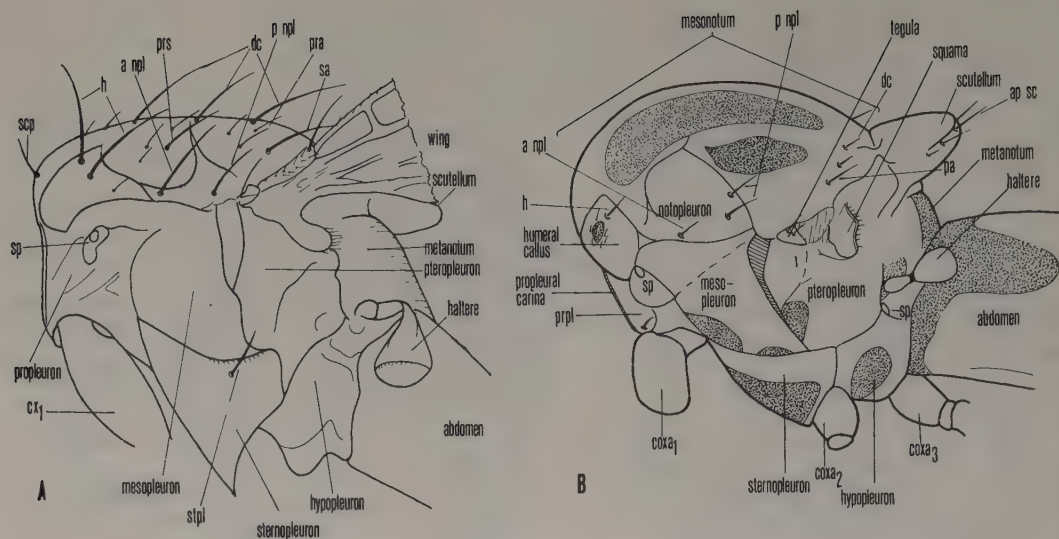


Fig. 11. Thorax, lateral view. — A. Siphonellopsinae (*Lasiopleura longepilosa* Strobl). — B. Chloropinae (*Chlorops* sp.).

tened dorsally. The *mesonotum* gives many good distinguishing characters. The surface is shining or dusted, smooth or sculptured in different ways. It can be bare or hairy, with the hairs evenly distributed or arranged in rows. Of the hairs arranged in rows the most conspicuous are the *dorsocentrals* (*dc*) and the *acrosticals* (*acr*). Distinct setae are the *anterior* and *posterior postalar bristles* (*a pa*, *p pa*), the *dorsocentral bristles* (*dc*), the *prescutellar bristles* (*psc*) and the *scapular bristles* (*scp*). Species of the subfamily Siphonellopsinae also have *supraalar* (*sa*), *presutural* (*prs*), and small *prealar* (*pra*) bristles. The mesonotum is unicoloured, usually black, or striped with light ground colour (yellow, green, brown) and five darker *longitudinal stripes* (black, brown, red). The *middle stripe* (*M*₁) usually ends distinctly before the scutellum and it is sometimes parted by a light streak along the *acr* line. Laterally of *M*₁ the *inner lateral stripe* (*M*₂) continues from the humeral callus to the *dc*. It is normally broader at the anterior end. Laterally of *M*₂ and behind the notopleural incision is the *outer lateral stripe* (*M*₃). In darker specimens of distinctly striped species an indistinct dark colour can continue behind *M*₁ to the scutellum, or the darker stripes are more or less fused.

The shape of the *scutellum* can be quite different in different forms: very short, semi-circular or greatly prolonged, flattened or not

flattened, with none or many scutellar bristles, which can be inserted on large finger-like tubercles. The *apical scutellar bristles* (*ap sc*) are usually well-developed while the *lateral scutellar bristles* (*la sc*) are normally smaller but numerous.

The *humeral callus* (*humerus*) (*h*) forms the anterodorsal corner of the thorax and is usually equipped with a dark *humeral spot* (*H*) and one (or more) *humeral bristles* (*h*). The complete *transverse suture* is not developed but the *notopleural incision* indicates its previous position.

At the sides of the thorax are the pleura. These can be hairy or bare, shining or dusted, unicoloured or spotted. The *notopleuron* (*npl*) forms a triangular depression at the sides of the mesonotum. It has one *anterior notopleural bristle* (*a npl*) and one or two *posterior notopleural bristles* (*p npl*). Below the notopleuron is the *mesopleuron* (*mpl*), often with one or two *mesopleural spots* (*MPL*). The *propleuron* (*prpl*), anterior of the mesopleuron, can below have one or a few *propleural bristles* (*prpl*). The for the chloropids characteristic *propleural carina* may sometimes be difficult to see without first removing its head. In not completely black species the *sternopleuron* (*stpl*) has a large *sternopleural spot* (*STPL*), of which the colour and dusting are of great importance. Only in Siphonellopsinae is there a real *sternopleural bristle* (*stpl*). The sclerite above the

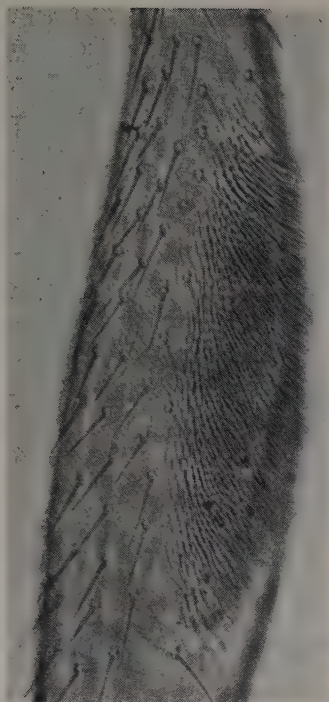


Fig. 12. Tibial organ. *Thaumatomyia* (*Chloropisca*) *glabra* (Meigen).

hind coxa is the *hypopleuron* (hpl) and above it and below the wing the *pteropleuron* (ptpl) with their spots (HPL and PTPL). Below the scutellum the thorax is terminated by the usually black *metanotum* (mn).

Legs. The legs are usually simple and relatively short. The hind femora (f_3) are sometimes thickened and the hind tibiae (t_3) correspondingly curved (fig. 71). In tropical forms also the anterior femora (f_1) can be thickened, and spines can be found on the ventral side of f_1 or f_3 . The legs are covered with short hairs but distinct named bristles are not present except one ventral apical spur on the middle tibia (t_2) and sometimes on t_3 . In many forms, most commonly in the subfamily Oscinellinae, there is an elongate oval area, covered with dense short and fine hairs, on the posterodorsal side of t_3 . It is usually called the "sensory area". As its function, appears to be unknown I prefer to mention it as the *tibial organ* (fig. 12). A similar organ is found in some species of the family Sepsidae, where it was found to have a secretory function (Šulc, 1928—1929). The males of many species of the subfamily Oscinellinae possess a femoral organ (fig. 13), consisting of a group of warts with short spine-like

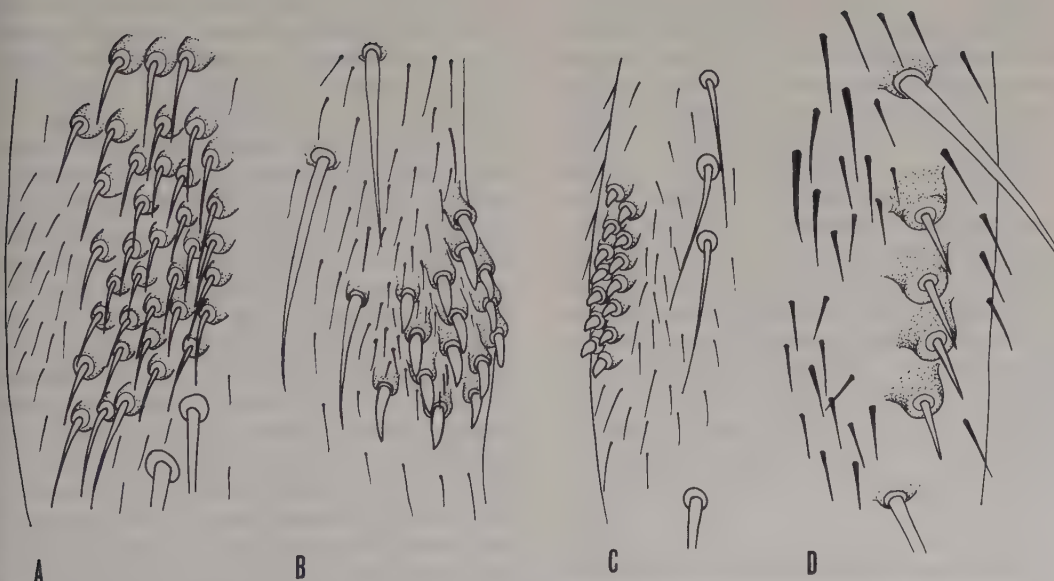


Fig. 13. Femoral organ. — A. *Elachiptera cornuta* (Fallén). — B. *Dicraeus styriacus* Strobl. — C. *Tropidoscinis albipalpis* (Meigen). — D. *Oscinella maura* (Fallén).

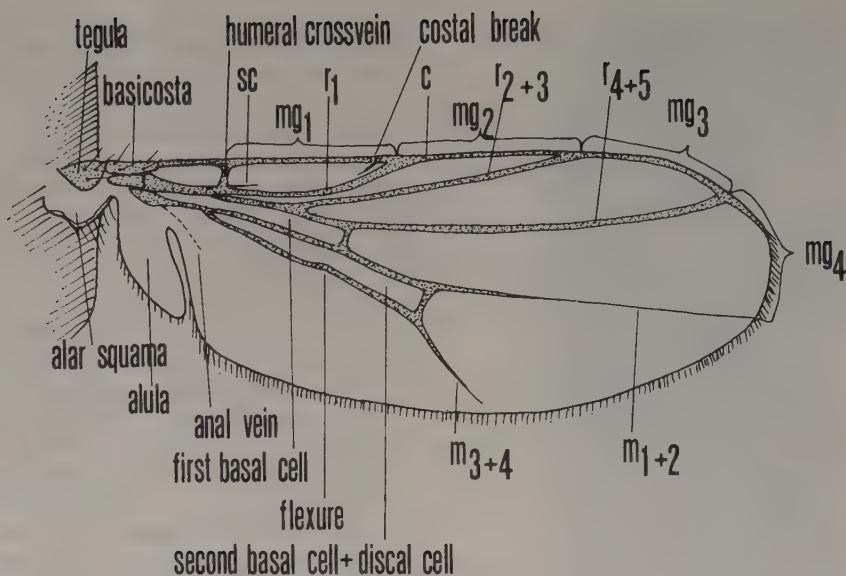


Fig. 14. Wing. Chloropinae (*Meromyza* sp.).

hairs on the middle femora. The organ is quite small and has been mentioned in the literature on only a few occasions (Balachowsky and Mesnil 1935); its function is unknown. The empodium, pulvilli and claws are of normal design.

Wings (fig. 14). The *costal vein* (costa, c) continues to the third vein or to the fourth vein and there is a *costal break* near the first vein. The costal segments are denoted by mg_1 , mg_2 , etc. The *subcostal vein* (sc) is retained only for a short distance near the humeral cross-vein or as an indistinct weak fold along the first vein. The first *three longitudinal veins* compose the radius (r_1 , r_{2+3} , r_{4+5}). The next two are branches of the media (m_{1+2} , m_{3+4}). The cubitus and the analis are absent except, in some cases, for an inconspicuous fold interpreted as the analis. The anal cell is therefore lacking. The *anterior cross-vein* ($r-m$, t_a) completes the *first (anterior) basal cell*. The basal cross-vein (t_b) is missing and therefore the *second (posterior) basal cell* is united with the *discal cell* which is terminated by the *posterior cross-vein* ($m-m$, t_p). A slight flexure of m_{3+4} at about the middle of its basal segment is typical for chloropid flies. In most cases the *alula* is well-developed and there is a small *alar squama* but no thoracic squama.

The halteres are of medium size with triangular knob. They are white, yellow or black.

Abdomen (figs 15—16). The abdomen is

ovoid, oval or almost cylindrical. The pre-abdomen, which can be seen from above, is composed of segments 1—5. The tergites 1+2, 3, 4, and 5 are well-developed, their lateral parts are turned over and partly cover the ventral surface of the abdomen. Sternites 1—5 are usually small, sometimes larger or divided and spiracles 1—5 are placed in the membrane near the tergites.

In the *male postabdomen* there is only one dorsal sclerite between tergite 5 and the epandrium. This sclerite is thought to represent the fused sternites 7—8. It bears two spiracles on either side. Griffiths (1972) has studied the homologies of the elements of the male genitalia of Schizophora, including Chloropidae. As will be explained below I am not prepared to accept Griffiths' homologies as proved and I therefore prefer to use a more conventional terminology (cf. van Emden and Hennig 1956).

Hypopygium (figs 15B—C). The epandrium is thought to represent tergite 9. In caudal view it is horseshoe-shaped; the opening is closed by the movable forceps, the *surstyli* (sur), which in some groups seem to represent a complex of sclerites, here named the *posterior*, *median* and *anterior lobes of the surstylus*. Encircled by the epandrium is the *supraanal lobe*, the *subanal lobe*, the *anus* and the *cerci*. The two first mentioned are usually rather indistinct but their presence is indicated by groups of small chaetae. The *cerci* can be free

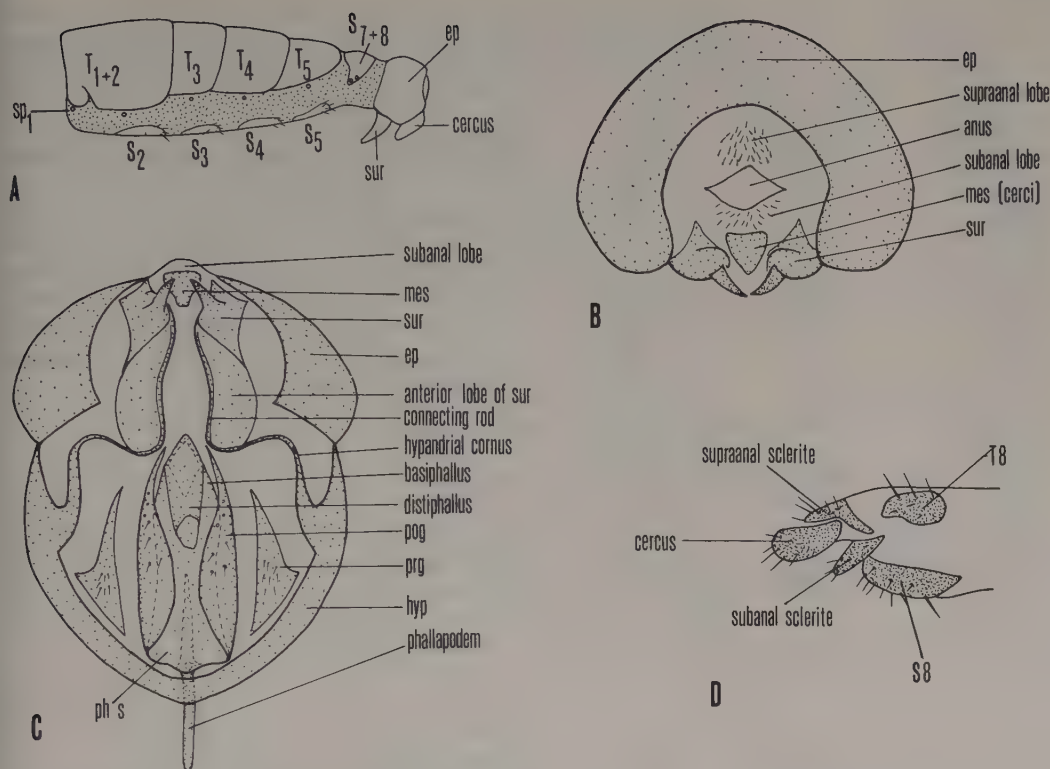


Fig. 15. — A. Male abdomen, lateral view (*Oscinella* sp.). — B. Hypopygium, posterior view (*Chlorops* sp.). — C. Male genitalia, ventral view (*Chlorops* sp.). — D. Terminalia of ovipositor, lateral view (*Oscinella* sp.).

or fused to a *mesolobus* (mes). One paired sclerite is sometimes found at the sides of the subanal lobe. This may represent the posterior lobe of the surstylus. The epandrium and its appendages form the caudal wall of the genital pouch. When the insect is at rest the epandrium and its appendages move downwards and forwards to cover the pouch. The genital pouch is also limited by the half-circular *hypandrium*, which represents sternite 9. Caudally this sclerite articulates with the epandrium. Anterior to this articulation there are the hypandrial corni which articulate with the anterior lobes of the surstyli or to a separate *ventral epandrial sclerite* (ep s), which can be divided. These sclerites apparently are the same as the *connecting rods* (processus longi) of Calypttratae or sternite 10 of the Syrphidae (Zumt and Heinz 1949). The *inner copulatory organ* is the phallus and the gonites. The basal end of the phallus the *basiphallus* (bph) articulates with the posterior end of the *phallapodeme*. Anterior of the phallus the phallapodeme forms a flat or more or less cup-shaped sclerite, the

phallapodemic sclerite (ph s) which usually reaches the hypandrium. The free end of the phallus is the usually membranous *distiphallus* (dph). The paired *postgonite* (pog) and *pregonite* (prg) are of different shape and are also arranged in different ways in different genera. Associated with the phallus is the ejaculatory bulb with its very minute *ejaculatory apodeme* (ej ap) (fig. 37 H).

In the *female postabdomen* (figs 15—16) segments 6—8 are variously modified to form the *ovipositor*. Sternites 6—8 are usually parted and tergites 6—8 sometimes so. The ovipositor is terminated by the cerci and the supraanal and subanal plates. The female reproductive system of *Oscinella* has been described by Nartshuk (1955).

Egg

The eggs are longish oval, slightly curved, with a reticulate or striate surface and, at low magnifications, without other apparent struc-

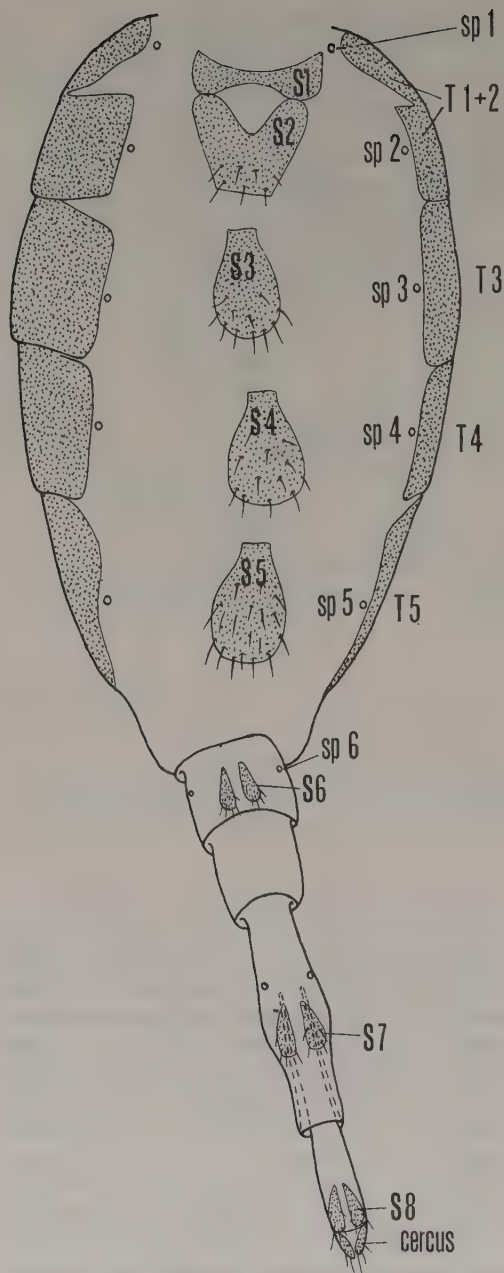


Fig. 16. Female abdomen, ventral view (*Oscinella* sp.).

tures or appendages. They have so far not been used in the classification of the family.

Larva

Many of the larvae are found in grass, others are predators on aphids or parasites on eggs of

spiders or orthopteroid insects. Some larvae, especially those of economically important species, have been described. However, it is not yet possible to describe a means by which all the larvae can be separated from all other dipterous larvae. Because too few are known the larvae cannot give much information about the relationships within the family. As in other schizophoroid larvae those of the Chloropidae are apodous, acephalic, pale-yellow. The head (fig. 17) has a more or less complex facial mask that can be used at least for distinguishing between species as can the rows of thoracic and abdominal cuticular spicules.

Puparium

The puparium is cylindrical, reddish brown to brown, with short prothoracic corni bearing the spiracles and the posterior spiracles on posteriorly projecting corni. The surface shows the spicular zones of the larva.

Character transformation within Chloropidae

The evolutionary process of anagenesis also leads to changes in the phenotype; that is in the complex of characters that can be used in taxonomy (see p. 11). Anagenesis normally involves a continuous step-by-step transformation of existing structures, and because these transformations usually take place at unequal rates in different evolutionary lines or branches there will be, in different related taxa, characters which have been subject to different degrees of transformation from the common character state in which the characters were when evolution began. Regardless of whether or not the existing character states of a particular character evolved in different related evolutionary lines, these phenotypic character states can be arranged in *character transformation series*, starting with the initial character state (the most unchanged, the most plesiomorphous) within a particular group, and then arranging the states according to increasing degree of change, so as to finish with the most changed state (the most apomorphous). The most unchanged character state is therefore identical with or closest to the state present in the common ancestor of the group; a state which represents the ground-plan condition of the character within the group. From a special

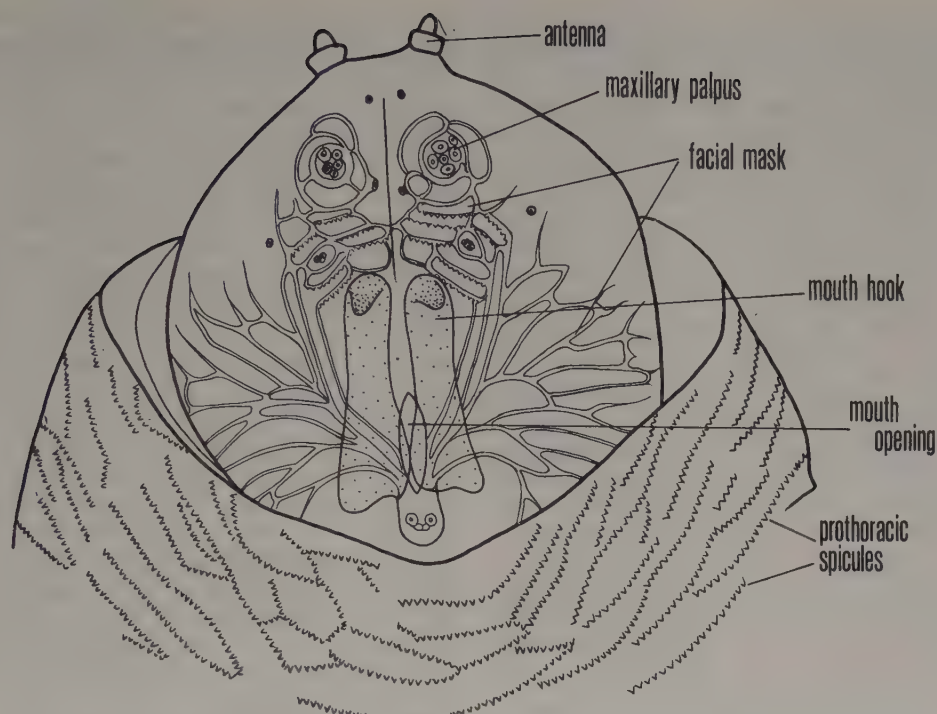


Fig. 17. Head and prothorax of larva (*Calamoncosis glyceriae* Nartshuk).

character state, evolution may lead either to increased complexity or towards reduction, or in separate evolutionary lines with a common ancestor, to different types of increased complexity and/or different types of reduction. These cases of parallel evolution will obscure the recognition of synapomorphies. Nevertheless a construction of character transformation series is a useful initial step in the phylogenetic procedure. When several obviously monophyletic groups have been established it will be possible to study the occurrence of parallel evolution for certain characters and to evaluate their taxonomic value.

In practice the only way to decide whether a character state is plesiomorphous or apomorphous in a recent taxon is to study its distribution within the taxon and within other taxa and to use the criterion of probability (see p. 15). In the following discussion, comparisons will also be made with the condition within Brachycera (Muscomorpha), within Cyclorrhapha and especially within Schizophora to which taxa Chloropidae undoubtedly belong.

The major changes made by Griffiths (1972) and others to the Schizophora (including the

Calypttratae and Acalypttratae), must drastically alter older views on the relationships among the character states. If this new system is correct, the character states formerly used as synapomorphies, such as number and location of costal breaks, reduction of anal vein, reduction of anal field, reduction of crossvein t_p , presence of subapical dorsal bristles on tibiae, presence of incurved *ori* etc. must be evaluated as present due to parallel evolution.

Size. The body size of the chloropids ranges from scarcely more than 1 mm to 8–9 mm, possibly 10 mm. Most species are 2–4 mm and there are relatively few over 5 mm. The situation within the different families among Diptera Schizophora is very different; in some the variation within the family is small but the average size is larger e.g. Heleomyzidae or smaller e.g. Asteiidae. In other families the variation is more like that of Chloropidae, e.g. in Sphaeroceridae. It is to be noted that many Oriental and Australian species of Siphonellopsinae are relatively large. Due to the great variation of size within Schizophora it is impossible to determine the ground-plan condition of this character for Chloropidae and therefore also the transformation series of size.

However it seems reasonable to assume that at least the extremes of small or large represent apomorphic states.

General shape. The general body shape of most chloropids is similar to that of the Diptera Schizophora; a stoutish body with relatively large head, usually somewhat narrower than thorax; thorax rather deep, and when seen from above, longer than broad; mesonotum moderately convex; and well-developed ovoid abdomen.

Within Chloropidae there are many examples of aberrant body shapes. Often the thorax and abdomen are long and narrow (*Meromyza*, *Mepachymerus*, *Lioscinella*), or short and broad with a high thorax, a large head, broader than the thorax, and a short abdomen (*Formosina*, *Siphylus*). In other cases the body is very flattened (*Oscinisoma*, *Eribolus*). Undoubtedly these three cases represent different transformation series from a common ground-plan condition leading respectively to long and narrow, to short, broad and high, and to a very flat body shape. Because different character states from these transformation series appear in various parts of the family, each transformation series is not confined to any special evolutionary line and this character is therefore repeatedly subject to parallel evolution.

General colour. As in most families of Diptera the cuticle in chloropids is black or brownish-black due to inclusion of melanin, which is the ground-plan condition. In many genera the content of melanin is reduced, imparting a brown to pale yellowish colour, either to the whole body or to certain parts of it. The reduction of melanin generally first affects certain parts of the body resulting in pale areas between patterns of dark stripes or spots. Furthermore these dark markings usually disappear in a definite order. The transformation series therefore leads from uniformly black or brown via patterned forms to uniformly pale brown or yellowish species. There are also many other schizophorous families which have wholly or partly pale brown or yellowish species. Therefore, the depigmentation of the cuticle seems to be an easily acquired apomorphy. Due to the existence of several cases of parallel evolution for this character state, its value as a synapomorphy is low.

Within the subfamily Chloropinae there are yellow (many genera, such as *Chlorops*, *Thaumatomya*, *Formosina*, etc.) or green (*Meromyza*) pigments in the epidermis. These pigments are present (or are visible) only where

there is a loss of melanin. Such epidermal pigments are not very common among Schizophora, but are present in Conopidae, Tephritidae and Agromyzidae. Their presence in Chloropinae could be an autapomorphy.

Due to the relative extent of melanic and non-melanic areas the multicoloured forms may be denoted as dark (black) with pale spots (yellow, green) or pale (yellow, green) with dark spots (black, brown, red) etc.

Structural colours are uncommon among chloropids. There is a metallic blue or green lustre to the thorax and/or abdomen of a few species (among *Lioscinella*, *Epimadiza*, *Polyodaspis*). More commonly there is a blue, green or even yellowish or reddish lustre on the frontal triangle (*Rhodesiella*, *Euthyridium*, *Thressa*) but this does not occur in all species of these genera.

Widely distributed among the families of Diptera is the presence of a dull, not shining, here called dusted, surface. The dusting consists of numerous small microchaetae. Within most families there are species which have lost these microchaetae on various parts of the body or from almost the whole body. When there is no obvious microsculpture on these surfaces they are usually smooth and shining. Within Chloropidae the situation is the same. The more universally dusted body is represented in all three subfamilies, as well as cases where there is more or less reduced dusting and almost completely shining species. The reduction of the dusting follows certain patterns, for instance the anterior and central of the mesonotum lose the dusting first; when the shining area becomes larger the notopleura, the lateral and posterior margins of the mesonotum and scutellum usually remain dusted. Very common are cases with a shining mesonotum and a dusted scutellum. Also the reduction of the dusting on the pleura follows certain patterns. It is usually primarily lost on the lower and anterior parts, especially of prpl, mpl and ptpl. On stpl the dusting is first lost on the anterior and upper parts, often leaving a dusted area towards the ventral corner. Even when other parts of the pleura have lost their dusting hpl very often remains dusted. Unusually dense dusting is present in some genera, such as *Aphanotrigonum*. Sometimes the microchaetae are longer and more hair-like giving a felt-like dusting, as in *Meromyzella*. The dusting is usually dark greyish-brown, but may become distinctly pale or bluish grey or distinctly brown. Sometimes dusting of more

than one colour is present in the same species giving a special pattern, usually in dark and pale grey or in grey and brown. Pale yellowish species usually have pale or colourless dusting. Thus within Chloropidae a universal, dark dusting seems to be the ground-plan condition with transformation series towards thicker (heavier) dusting caused by more numerous, broader scale-like or longer hair-like macrochaetae. Transformation also affects the general colour of the dusting towards pale, light grey or brown or to a multicoloured pattern. The reduction series goes through various degrees of dusting, which affects the various body parts after special patterns, to the almost complete loss of dust.

The cuticle of Diptera is smooth in the ground-plan condition. This means that when there is no dusting the sclerites are brilliantly shining, but due to a distinct microsculpture of lines, punctures or granulae etc. the sclerites may be less shining or even rather dull. Within Chloropidae the surface of the sclerites is normally very smooth and therefore areas with thin dusting are sub-shining and those without dusting are shining. But cases of distinct microsculpture are not uncommon. The microsculpture is either reticulated, wrinkled, punctured or granulated. All these kinds can be more or less coarse. Reticulated microsculpture is present on the frontal triangle of *Cryptonevra*, wrinkled microsculpture on the pleura of *Polyodaspis*, punctured microsculpture on various parts of *Platycephala*, *Eurina* etc., and granulated microsculpture on the mesonotum and scutellum of several genera. Granulated microsculpture is present on surfaces covered with macrochaetae (hairs) because the granulae are associated with the sockets of the hairs. There are two distinct types of granulae, rounded as in *Centorisoma* and stellate as in *Elachiptera*. The above-mentioned types of microsculpture are to be regarded as separate apomorphies derived independently from the smooth ground-plan condition, except perhaps that the stellate granulae might be a further transformation of the small rounded granulae.

Within Schizophora the macrochaetae are normally black, cylindrical, gradually narrowing towards the tip, distinctly curved and arising from simple sockets. The relatively longer and stouter ones are called bristles or setae; the shorter, and more especially the slender ones, are called hairs. In the ground-plan condition of Chloropidae, the macrochaetae have the same form and arrangement.

There are transformation series of various kinds. The bristles and hairs can become paler, brown, yellow to whitish. This most commonly occurs when the integument of the body is paler. Usually the hairs and smaller bristles become paler before the stouter bristles. Sometimes the macrochaetae are silvery-white even when the cuticle is otherwise black (*Bathyparia*). There are also cases when the hairs and bristles on all body parts are long and slender (*Trichieurna*), or very short and stout (*Siphonellopsis*, *Aphanotrigonum*). On special parts of the body, such as on the ventral side of f_1 (*Epimadiza*) or f_3 (*Platycephala*), bristles are very short and stout, spinous. In very aberrant species this can also occur on other body parts (*Echimba*). Secondary developments are exhibited by the long, strong and straight *dc* in *Semaranga* and the numerous long quills of *Myrmecosepsis*.

Head structure. To judge from its structure among the schizophorous families the head, in lateral view, is squarish to rounded, somewhat higher than long and, in dorsal view, broader than long, somewhat narrower than thorax. This is the ground-plan condition within Chloropidae. Also included in this ground-plan are the rounded, moderately large eyes, the medium-sized proboscis, and the short antennae with small ant_1 , short ant_2 and rounded, disc-like ant_3 with slender and moderately pubescent arista. Among the head characters there are many transformations, some of which, as far as can be seen, are independent, while others are strongly correlated with each other.

Colour of the head. Most commonly the frontal triangle, the occiput or the whole posterior half of the head, including the posterior part of the jowls are black, while the anterior part of the jowls, the face and the anterior part of the frons, or the whole frons, are yellowish. This is most likely the ground-plan condition for Chloropidae. The remains of this pattern can often be traced in derived forms; for example in black species the anterior margin of frons and parts of the face are pale brown or yellowish, while in pale yellowish species the back of the head or parts of the occiput often remains black or are more or less brownish.

In the most plesiomorphous state the eyes are round to oval with vertical or slightly oblique long axes. When the long axis of the eye is oblique, its lower end is always directed forwards. In this state the jowls are moderately broad, cheeks often visible in lateral view, as is the posterior part of the head (*Siphonella*).

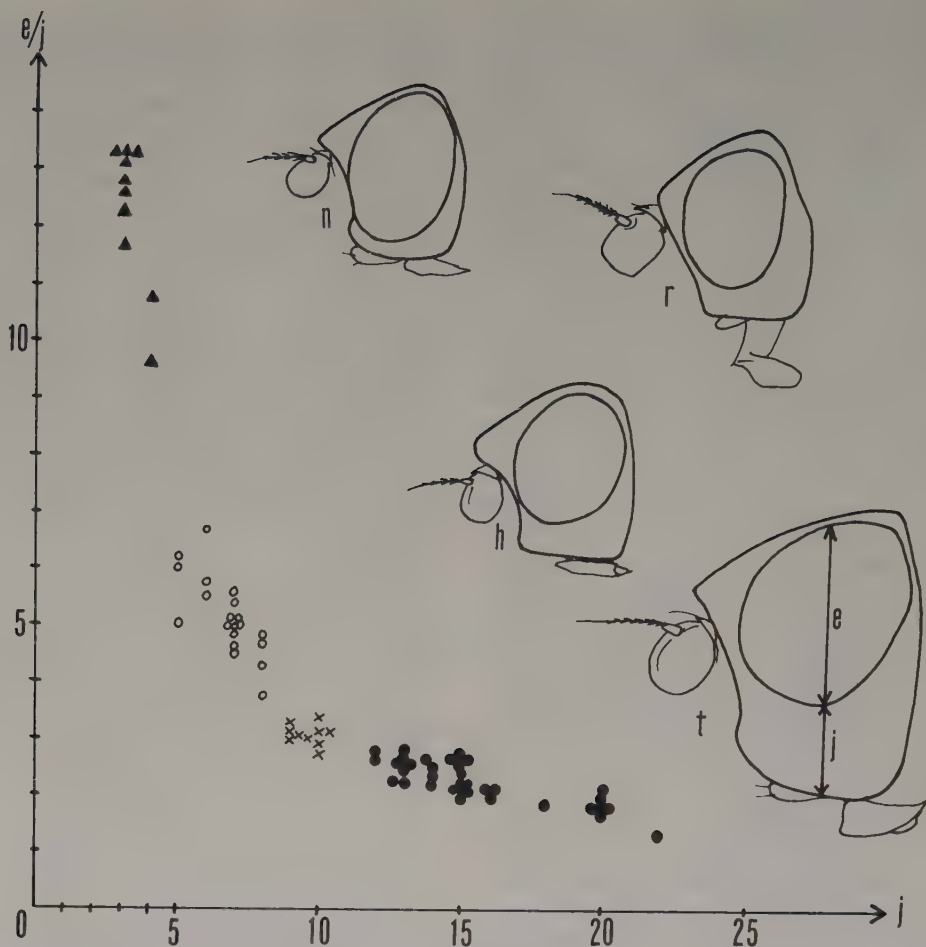


Fig. 18. Allometry in the relation between height of eye (e) and width of jowl (j) among *Thaumatomyia* species. $\blacktriangle$, $n = T. notata$ (Meigen); $\circ$, $r = T. rufa$ (Macquart); $\times$, $h = T. hallandica$ Andersson; $\bullet$, $t = T. trifasciata$ (Zetterstedt).

The eyes can increase considerably in size, in lateral view covering the whole head, except for the tip of the frons and the very narrow to linear jowls. The eyes can also be more narrowly oval with increasingly oblique to horizontal long axes. In this case the jowls become broader, initially in the posterior part. The smaller eyes of the ground-plan condition are substantially directed sideways and consist of equal-sized ommatidia. In many cases the eyes are moved forwards and upwards and the field of vision is increased in these directions. Correlated with this is the increase in size of the anterior and anterodorsal ommatidia. Hairs on the eyes are universally found throughout Diptera, although there are distinct differences in hairiness within the families, ranging from a

dense covering to obviously naked eyes. The same situation is present within Chloropidae. Many moderately long hairs on the eyes is probably the ground-plan condition. The dense covering of very long hairs is therefore apomorphic and so are the almost naked eyes with only sparse short hairs, the probably most common state, and completely naked eyes. The transformation series for the eyes thus leads to a general increase in size, to oval more forwardly directed eyes, to different sized ommatidia within different parts of the eyes, and to increasing or decreasing hairiness.

As has been mentioned above the width of the jowls is partly dependent on the size of the eyes. Undoubtedly a moderately broad, smooth jowl, dusted, except perhaps on its lower mar-

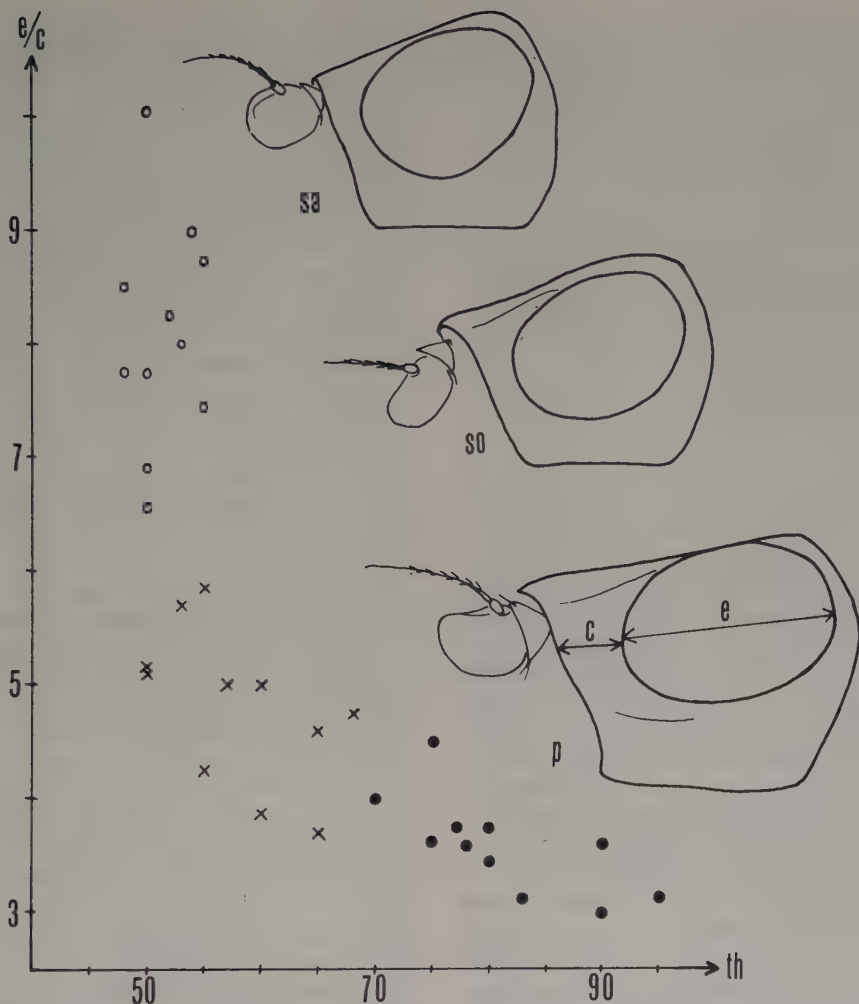


Fig. 19. Allometry in the relation between length of the eye (e) and breadth of cheeks (c) in the *Meromyza saltatrix* group. $\bigcirc$, sa = *M. saltatrix* (Linnaeus); $\times$, so = *M. sororcula* Fedoseeva; $\bullet$, p = *M. pratorum* Meigen; th = length of thorax.

gin, bearing one row of peristomal hairs below and one or a few peristomal bristles behind, is the ground-plan condition. Besides being the most common condition within the three sub-families, it is also universally and commonly distributed throughout the Schizophora. A special type of jowl, narrow, normal or very broad, is often characteristic for a whole genus, but this may not always be the case. When there are certain difference in the general body size within a genus, or a closely related species group, the differences in width of jowls can be considerable due to allometry. In some tested cases there is little variation in the size of the eyes, both within the species and between them.

Thus the larger specimens or species come to have relatively broad jowls and the degree of allometry seems to be the same both within and between the related species, as can be seen for *Thaumatomyia* and the *Meromyza saltatrix*-group (figs 18—19). The width of the jowl has frequently been used as a diagnostic character but must be used with caution because of this allometry. Apomorphous transformations of the jowl characters often produce the following: the width becomes distinctly broader behind than in front (in connection with a more oval eye with strongly oblique long axis, *Eribo-lus*, *Stenophthalmus*); it develops two or more rows of hairs on the jowl (*Pseudeurina*) and

finally the hairs cover most parts of it (*Tachinoceras*); the hairs arise from large punctures (*Pseudeurina*); the jowls become wrinkled (*Platycephala*, *Lipara*); the lower shining area becomes enlarged (*Polyodaspis*); the dusting on the anterior part becomes thicker and silvery-white (*Elachiptera*, *Mepachymerus*, etc.). In the ground-plan the vibrissal angle is almost right (about as in *Lasiopleura*). From this state lead two transformation series, one towards an acute projecting vibrissal angle (*Aphanotrigonum*, *Siphunculina*, sometimes correlated with prolonged proboscis and prolonged palpi as in *Oscinimorpha*), and one towards an obtuse angle (and usually retreating face, as in *Trichieurina*).

Although the frontal triangle is one of the most characteristic features of Chloropidae, similar structures are present in several closely or less closely related families (eg. Milichiidae, Carnidae, Ephyridae, Sepsidae and Sciomyzidae). Even so the frontal triangle in Chloropidae has sufficient characters to set apart from the other families. In the ground-plan condition the frontal triangle is undoubtedly heavily sclerotized, smooth, black, naked, rather broad, with somewhat convex side margins, reaching to about the middle of the frons (*Lasiopleura*). There are many character transformation series for the frontal triangle. Sometimes it is prolonged and reaches to the front of the frons (*Dactylothyrea*), often only through a narrow stripe (*Anthracophagella*). The frontal triangle can become narrow with straight (*Desertochlorops*) or with more or less concave side margins (*Stenophthalmus*). The frontal triangle can also become wider (*Diplotoxa*) with a retained and distinct apical tip. Often the apex is rounded (*Tachinoceras*), sometimes in connection with increased breadth (*Camarota*, *Platycephala*), so that the frontal triangle finally comes to cover almost the whole of the frons. On the other hand, the frontal triangle can be reduced to a very small size (*Trachysiphonella*) or disappear altogether (*Cestoptectus*). The frontal triangle was originally smooth, but the smoothness can be lost in various ways. These changes can result in finer or coarser reticulated microsculpture (*Cryptonevra*), coarse punctures (associated with numerous *if* on the surface, *Anomoeoceros*, *Platycephala*), in ridges more or less parallel with the side margins (*Anthracophaga*, *Anthracophagella*), in one or three central ridges, or in oval or longitudinal narrow depressions (*Assuania*, *Cryptonevra*). The frontal triangle is most probably dusted in the

ground-plan condition, but this is often partly or completely lost. When the frontal triangle is not completely shining the dusting remains on and round the ocellar tubercle, and along the margins of the frontal triangle, especially at the corners. The colour of the frontal triangle is usually darker than the frons, often black. When the frontal triangle becomes paler the loss of melanin first affects the margins, sometimes leaving an area shaped like a poplar-leaf around the ocellar tubercle (*Chlorops*) or an oval or diamond-shaped black spot (*Lasiosina*) in front of the anterior ocellus or on the apex. Sometimes the poplar-leaf spot encloses two half-moon shaped, semi-transparent window-spots (*Chlorops*).

The interfrontal bristles (*if*) develop in close association with the frontal triangle. In the Siphonellopsinae there is only one or a few pairs of rather large, incurved bristles inserted on the frons and clearly separated from the frontal triangle. *if* are present in some other Schizophorous families, especially the Milichiidae, Carnidae and Sphaeroceridae, although in these families they are often inserted onto distinct narrow strap-shaped sclerites, the interfrontal lists. However, these sclerites are often reduced and are never found in the Chloropidae. In Oscinellinae and Chloropinae the *if* become more numerous and are situated close to the margin of the frontal triangle, on the margin or on the surface of the triangle (*Camarota*, *Neoloxotaenia*) but still forming one row on each side. When the *if* are present on the surface they can become more numerous, form two or more rows (*Thaumatomyia*), or spread irregularly over the whole triangle (*Anomoeoceros*, *Platycephala*). In the latter case the *if* often arise from distinct punctures.

Three ocelli are always present on the ocellar tubercle. They can be small or large, but their size is not correlated with body size. Frequently the anterior ocellus is somewhat larger than the posterior ones. In the ground-plan condition the ocellar bristles (*oc*) are, as for Schizophora in general procurved and divergent. This plesiomorphous state is present among Siphonellopsinae, Rhodesiellini and Chloropinae. In a few Chloropinae the *oc* are procurved, not distinctly divergent, but more parallel or even convergent. The length of the *oc* varies, sometimes short when the bristles in general are short, sometimes shorter or longer than *pvt* and the other vertical bristles. In some Oscinellinae the *oc* are recurved and parallel to convergent.

As in the ground-plan condition of Schizo-

phora the outer vertical bristles (*vte*) of Chloropidae are outcurved, more or less upright or directed backwards, the latter mostly dependent on the slope of the vertex. They vary in length, but are usually distinct and longer than *vti*. The inner vertical bristles (*vti*) are, as is normal in Schizophora, incurved and procurved. A few exceptions are found in aberrant forms such as *Sepsidoscinis* and *Myrmecosepsis*.

In many genera there is one row of post-ocular ciliation reaching from the vertex down to the jowls. This is a plesiomorphous state because such ciliation is the usual condition within Schizophora. In many chloropids these hairs are reduced to a few or are absent.

The face of chloropids is normally vertical, or somewhat sloping backwards, flat or slightly concave, often with an indistinct carina in the upper part between the bases of the antennae. The structure of the face of the schizophorous Diptera is rather different within different families but the above-mentioned features are widely distributed and most probably represent the ground-plan condition for Chloropidae. Thus the distinct long and broad facial carina (*Lipara*) and the complete but narrow, from above triangular, carina (*Tricimba*, *Osciniomorpha*) are apomorphic features.

The clypeus is highly variable with an anterior transverse sclerite that is broad or narrow, high or low with short or long posterior corni. However the shape of the clypeus is strongly correlated with the shape of other parts of the head, such as breadth of face, shape of mouth opening, and length of proboscis. In the ground-plan condition the proboscis is of moderate size (*Conioscinella*) while an extremely short or prolonged proboscis (*Siphonella*) are apomorphic features. The palpi are cylindrical in the ground-plan condition of Chloropidae as in other Schizophora. Transformation series lead to very short bud-like palpi (in some *Chlorops*) or to long slender ones (usually but not always in connection with prolonged proboscis). The palpi can become flattened and broader at apex or thickened, somewhat clavate. Sometimes, as in *Chlorops* and *Anthracophagella*, they are associated with a lateral depression (sensory groove). The vibrissal seta (*vi*) is present in the ground-plan condition, but sometimes it is very small and impossible to distinguish from the surrounding hairs (*Tachinoceras*) or it is present in a group of longer hairs (*Anomoeoceros*).

The cheeks (facial orbits) are normally narrow and indistinct; in most cases not visible in lateral view and only linear in frontal view.

Only on special occasions in large species, or in forms with a prolonged head, do they become more distinct or even rather broad (*Lipara*, *Trichieurina*).

In the ground-plan condition the frons, in lateral view, is somewhat projecting, which is the case in most of the genera. A strongly projecting frons is present in some genera both of Oscinellinae (*Pseudeurina*) and of Chloropinae (*Platycephala*, *Eurina*). The frons is most commonly about as long (measured from *pvt* to anterior margin) as broad (measured opposite anterior ocellus) or longer than broad, more rarely distinctly broader than long (*Anthracophaga*, some *Chlorops*). It is often narrower in front than behind, but this is not always the case; however, due to shrinking of the anterior part of the head in dry specimens the state of this character is often difficult to decide. The shape of the frons is also influenced by the development of other characters, such as width of the head, size of eyes, and the degree of projection of the frons itself. In the ground-plan condition the frons is smooth, dusted and equipped with a few frontal bristles (*fr*). The transformation series lead to a heavier sclerotized, shining frons (*Fiebrigella*), to a punctured sculpture and numerous short *fr* distributed all over the surface. When there is general increasing size of hairs and small bristles (as in *Trichieurina*), or when they are generally reduced or lost (as in some *Aphanotrigonum*), the *fr* are also influenced in the same way.

The ground-plan condition of the antennae within Schizophora is a very short ant_1 , a short ant_2 and a rounded or oval, flat ant_3 with a 3 segmented, slender, pubescent arista. The first segment of the arista is usually very short, the second segment short but distinct and the third segment (flagellum) long, basally thickened. The ground-plan condition in Chloropidae is close to this; ant_3 being rounded, high as long or somewhat higher than long, ant_2 having a distinct dorsal bristle and ant_1 is very small. The antennae of Chloropidae exhibit numerous evolutionary trends. One transformation series leads towards prolonged antennae with only ant_3 prolonged (*Bathyparia*) or with ant_2 and ant_3 moderately prolonged (*Assuania*), with only ant_2 prolonged (*Tachinoceras*) or with all three segments prolonged (*Neoloxotaenia*). ant_3 can also develop in various other ways; the upper corner can be projecting (*Bathyparia*, *Anomoeoceros*), the whole segment can become kidney-shaped (*Mepachyme-*

rus, *Pachylophus*), or the segment can become broadened below so as to give an onion-like shape (*Oscinimorpha*). The arista is normally inserted in a dorsal position on ant₃. When ant₃ becomes kidney-shaped the arista is usually sub-terminal or even terminal (*Pachylophus*, *Elachiptereicus*, *Mepachymerus*). The relatively long, slender, shortly pubescent arista can become very short (*Eutropha*) or very long (*Globiops*, *Metopostigma*), almost naked (*Siphonellopsina kokagalensis*, *Bathyparia*), or densely hairy (*Pachylophus*). A special case with a pectinate arista is found in *Thressa*. The arista irrespective of pubescence can become very slender (*Metopostigma*) or more or less thickened, broad, flat and swordlike (*Semarang*). In the latter case the basal segments are often prolonged, sometimes considerably so (*Elachiptereicus*, *Semarang* cf. *Mepachymerus*). A white, often basally yellow, arista is also to be considered as a derived state. The white arista is more common and is associated with the rather thick pubescence.

According to Griffiths (1972) the plesiomorphous character state for the orbital bristles in Schizophora is the presence of at least 2 superior orbitals (*ors*), none of them proclinate (procurved) and no inferior orbitals (*ori*). Within Chloropidae there appears to be no distinct *ori*. In Siphonellopsinae there are three distinct outcurved to procurved bristles near the eye margin, but these do not arise from any distinct supra-orbital plate. The arrangement of these bristles do not correspond with the procurved and recurved *ors* of Drosophiloidea. In many other genera there are 1–3 more distinct upright to recurved bristles. However, the most common and most widely distributed situation is one row of numerous, often 10 or more, subequal recurved or procurved small bristles. Although they may include the true *ors*, it seems more probable that they, at least partly, are a secondary development of *fr*. For this reason I prefer to name all types of bristles in a row along the eye margin as orbitals, *orb*. The *orb* outside Siphonellopsinae are usually recurved, in some genera of Chloropinae procurved. Both types can be independently derived from the situation in Siphonellopsinae. The arrangements of *orb*, as found in Siphonellopsinae, is also present in Milichiidae, Carnidae and some Ephydriidae. The character states of Oscinellinae and Chloropinae do not seem to be present in other schizophorous families. It is to be noted that, in addition to the rows of small recurved or procurved setulae

along the eye margin in Agromyzidae, there are both distinct *ori* and *ors*.

Thorax. As mentioned before in connection with the general body shape, there are various trends that affect the general body shape and therefore also the thorax. The ground-plan condition is a rather high (deep) thorax, in dorsal view about as broad as long or somewhat longer. In many genera the thorax is markedly longer than broad (*Platycephala*, *Meromyza*, *Eribolus*), while in others it is broader than long (*Formosina*). The humeri in *Sepsidoscinis* and *Myrmecosepsis* have, in connection with the enlarged pronotum, become largely transformed by the development of secondary ridges. The precense of 1 distinct recurved *h* is the most common state among Schizophora and obviously represents the ground-plan condition for both the whole group and for the Chloropidae. The second, incurved *h* of Siphonellopsinae should then be an apomorphy for that subfamily. Apart from the Chloropidae, such an incurved *h* is present in some Sphaeroceridae (*Leptocera*) and in somewhat different position (more antero-ventral to the recurved *h*) in Tethinidae. If this indicates a closer relation between Chloropidae and these groups, the incurved *h* of Siphonellopsinae should then represent the most plesiomorphous state while this *h* should have been lost in the other subfamilies. These relations will be discussed more thoroughly elsewhere.

The one incurved *h* of Lonchopteridae and the second incurved *h* in Dolichopodidae seem certain to be present due to convergence or parallelism because these families are very distantly related to Chloropidae (Lonchopteridae does not belong to the Schizophora and Dolichopodidae is not even in the Cyclorhapha). As an apomorphous state *h* is often reduced, not distinguishable among the hairs, or is absent.

As can be concluded from the prevailing situation within Schizophora the ground-plan condition for the mesonotum is that it is moderately convex, black, smooth, dusted, with distinct pre- and postsutural *dc*, distinct *prs*, *pra*, *a pa* and *p pa*, *acr* in two distinct lines, more or less parted. This plesiomorphous state is fairly well-preserved within most Siphonellopsinae, especially *Lasiopleura* and related forms. However, there are many character transformations. The mesonotum can become less or more flattened (*Camarota*, *Eribolus*), or more convex (*Formosina*). The surface can be more heavily dusted with brown, grey,

bluish or white dusting, or more weakly dusted and sub-shining. The dusting can disappear in different ways, leaving certain areas or stripes dusted (*Oscinella trigonella*, *Elachiptera cornuta*, *Pachylophus*), or become completely lost. The surface can lose its smoothness by the development of more or less deep longitudinal depressions or grooves along the *dc* and also along the *acr* lines. These can be granulated. The surface can come to have a coarse reticulated, punctured, granulated or stellate microsculpture. The colour can change to brown or yellow with or without 1—5 longitudinal darker black, brown or red stripes. The bristles can be reduced, some can disappear completely or become small and hair-like. Small hairs can be numerous, often very numerous, over the whole surface. Then they are often parted along the *acr* and *dc* lines. Bristles can become short and stout and arise from distinct sockets (*Echimba*, *Calamoncosis aspistylina*). The hairs can become strong, straight and spike-like as in *Myrmecosepsis*. All these transformations can occur independently of each other.

In the ground-plan condition the scutellum is, as in most Schizophora, rounded, convex and rather short, less than half-circular, that is broader than long, black, dusted, smooth and with 1 pair of *ap sc*, 1 pair of *la sc* and a few hairs above. Within the Siphonellopsinae the *la sc* are distinctly shorter than *ap sc* but nevertheless, as in the ground-plan for Schizophora, rather long and stout and placed closer to the front margin of the scutellum than to the *ap sc*. Commonly more, sometimes many (*Polyodaspis*), bristles appear along the margin of the scutellum. These secondary bristles are also regarded as *la sc* because there is no substantial difference between them and the original *la sc*, apart from their position in relation to *ap sc*. The scutellars often arise, especially within Oscinellinae, from distinct warts (*Tachinoceras*) which can develop into long finger-like projections (*Dactylothyrea*). These are obviously apomorphic conditions. The scutellum can also become shining, and develop a more or less coarse microsculpture of the same kind as that on the mesonotum. Furthermore the scutellum often becomes flattened, prolonged, triangular (*Tachinoceras*), or even long and narrow (*Pseudogaurax*) or broad and flat (*Euthyridium*, *Nomba*).

The ground-plan condition of *npl* within Schizophora is 1+1. This is also the situation within Siphonellopsinae and many other genera or species of the other sub-families, especially

the whole of the Rhodasiellini. In most genera of Chloropinae and Oscinellinae 2 *p npl* are present, that is to say so commonly that 1 *p npl* in these groups seems to be secondary. In a few cases three or more *p npl* are present. The transformation series for *p npl* should then be

$$1 \rightarrow 2 \begin{matrix} \nearrow 1 \\ \searrow 3 \end{matrix} \rightarrow \text{more.}$$

The ground-plan condition of the pleura within Schizophora seems to be smooth, black, dusted with hairs and bristles at least on *npl*, *mpl*, *ptpl* och *stpl*; character states which are widely spread throughout the group. However, there are many exceptions, for hole families or separate genera, when one or more of these characters are present in a reduced, apomorphic state. The reductions of the bristles and hairs usually take place in a determined order; firstly from *ptpl*, secondly from *mpl* and lastly from *stpl* and *npl*. When the dusting becomes reduced this evolutionary process starts on the anterior and ventral parts of pleura. The ground-plan condition of Chloropidae is obviously identical with that for the Schizophora as a whole, except that there are no distinct *mpl* bristles, only short *mpl* hairs. The reduction series show the same pattern as for the whole group. Apomorphic transformations of pleural characters within the Chloropidae are also shown by the increased number of hairs (never bristles) on *stpl* and/or *mpl*, coarse wrinkled or punctate microsculpture and the loss of melanin in the cuticle leading to a pattern of black, brown or red spots. These spots disappear in a certain order, but the last to go are the *stpl* spot, the antero-ventral *mpl* spot and the *hpl* spot. Secondary specialization is also shown by the development of large depressions in the anterior region of *stpl* and *mpl* and the posterior region of *ptpl*, *stpl* and *hpl* to provide space for the legs to be withdrawn (eg. *Aphanotrigonum*).

Legs. In the ground-plan condition the legs in Chloropidae are moderately long and stout, simple, hairy, without distinct bristles, except for one ventral apical spur on *t*₂. The tibial organ on *t*₃ is so widely distributed among the genera that it most probably represents the ground-plan condition. Its relation to similar structures in Sepsidae, which have been shown to have a secretory function (Šulc 1929), is doubtful. Their function within the Chloropidae is unknown but they are commonly referred to as a sensory area. Until their function is settled I prefer to use the term "tibial organ".

It is for the same reason that I use the term "femural organ" for a special structure in the males of most Oscinellinae. Transformations of the legs lead towards long slender legs (*Mepachymerus*) or short, stout legs with especially stout f_1 and f_3 (*Aphanotrigonum*). In its most plesiomorphous state the tibial organ is oval, longer than half length of tibia and the transformation leads to narrow, linear or short organs and finally to their complete loss. Specializations of the legs in Chloropidae lead to prolonged, laterally compressed fore tarsi (*Mepachymerus*), thickened f_1 with rows of stout spine-like bristles below (*Epimadiza*, *Aragara* Walk.), and thickened f_3 with rows of wart-like spines below and a strongly curved t_3 (eg. *Meromyza*, *Pachymerus*). The femural organ is a group of warts, each bearing a small bristle, on the dorsal surface on f_2 in many male Oscinellinae. The most plesiomorphous state is most probably an irregularly rounded group of warts with relatively long and slender bristles (*Lipara*). Transformation leads to warts in more distinct rows, then to two rows (*Tropidoscinois*) and finally to one row (*Oscinella*). The bristles become short and stout (*Dicraeus*). A distinct, often very long curved, ventral spur in an apical or subapical position on t_3 (*Hippelates*, *Parahippelates*) is present both in genera of Siphonellopsinae and Oscinellinae. A small indistinct spur is also present in some species of a few other genera (*Aphanotrigonum*). A similar curved spur is present in some Sphaeroceridae. In other related families there is an apical spur at the tip of t_3 but this is usually very short and indistinct. It is probable that such an indistinct spur was present in the stem-group of Chloropidae and that it has been reduced to the short hair-like chaetae present at the tip of t_3 in Chloropidae, except for a few cases where it has independently become enlarged and curved.

Wings. Except for a few aberrant (*Camarota*, *Sepsidoscinois*), apterous (*Myrmecosepsis*, *Alombus*) or brachypterous (*Elachiptera*, *Aphanotrigonum*, *Crassivenula*) species the wings of Chloropidae are in general features very characteristic with costal break before tip or r_1 , indistinct sc, absence of t_b , anal cell and anal vein, and more or less distinct flexure on the basal segment of m_{3+4} (except in *Siphunculina* and a few other genera). In the ground-plan condition the costa reaches m_{1+2} . The apomorphic feature, costa reaching only to r_{4+5} or slightly beyond r_{4+5} is present in all Chloropinae and a few species of *Dicraeus*. In the

plesiomorphous state the ratios of the costal segments are $mg_1 < mg_2 > mg_3 > mg_4$, but changes, especially in the length and curvature of r_{2+3} and r_{4+5} , can alter these values. The mean values for those genera studied are:

	mg_1 : mg_2 : mg_3 : mg_4
Siphonellopsinae	= 23.5: 38.5: 25.0: 11.0
Oscinellinae	= 28.0: 31.9: 22.9: 12.7
Chloropinae	= 26.9: 32.5: 25.1: 15.2

Veins r_{2+3} , r_{4+5} and m_{1+2} are, in the ground-plan condition, of about the same thickness, straight, except perhaps for a slightly procurved tip just before the costa. It is not uncommon to find that these veins are distinctly procurved over various distances, especially r_{2+3} and r_{4+5} . Sometimes m_{1+2} is also procurved in the Oscinellinae. In Chloropinae m_{1+2} is always distinctly thinner and often recurved, so that r_{4+5} and m_{1+2} often become distinctly divergent. The apical segment of m_{1+2} is sometimes basally strongly recurved (*Rhodesiella*). As in other schizophorous families t_a is found in various positions in relation to the tip of r_1 . The values for those genera studied are (number of nominal genera):

	Siphonellopsinae	Oscinellinae	Chloropinae
t_a outside tip of r_1	1	6	6
t_a opposite tip of r_1	1	11	5
t_a inside tip of r_1		26	29

Thus there is a distinct tendency for t_a to have a proximal position within the family.

As t_p is lost the discal cell and posterior basal cell are united (here called discal cell). t_a , as in most other families, is found in various positions on the discal cell. Value for those genera studied are (number of genera):

	Siphonellopsinae	Oscinellinae	Chloropinae
t_a outside middle of discal cell	2	37	34
t_a inside middle of discal cell		6	6

In connection with a distinctly proximal position of t_p (at the same time apical segment of

m_{1+2} becoming unusually long) the distance between t_a and t_p becomes unusually short. In 7 genera of Chloropinae this distance is shorter than the length of t_p , also an apomorphic feature. The posterior cross-vein (t_p) is often more or less oblique, especially within Oscinellinae. Segment t_a-t_p of m_{1+2} forms an angle with the costa of about $18-30^\circ$. The angle t_p/t_a-t_p is about $60-95^\circ$ in Oscinellinae and about $80-105^\circ$ in Oscinellinae. When t_p is produced towards the costa it cuts mg_2 , the tip of r_{2+3} or mg_3 . The values for those genera studied are:

	Siphonellopsinae	Oscinellinae	Chloropinae
cuts mg_2	2	28	39
cuts tip of r_{2+3}		7	1
cuts mg_3		8	

These values on angles and cutting points indicate a tendency for t_p to become more strongly oblique in Oscinellinae, although the cutting-point is dependent both on the angle and the relative length of r_{2+3} . Sometimes the anterior basal cell and the discal cell are very narrow (*Thressa*). Also there are apomorphic states with relatively long and narrow (*Mero-myza*) or short and broad wings (*Aphanotrigonum*).

The wing membrane is normally relatively thick, colourless, faintly tinged or tinged dark grey or brown. In some groups the wing membrane is very thin and iridescent (*Thaumatomyia*, *Thressa*). Sometimes it can be whitish in xerophilous or sea-shore species (*Oscinimorpha*) or have distinct black spots, especially along the costa and on wing apex (*Gampso-cera*).

Many of the above-mentioned transformations of the wings are independent of each other. The wings therefore provide many distinctive characters. However many of the transformations occur simultaneously in different evolutionary lines which make these characters less useful for phylogenetic analysis.

Abdomen. The general shape of the abdomen among the families of Schizophora varies within wide limits, from long and narrow, via oval or ovoid to short and broad. Even if the shape is usually uniform within a single family there are exceptions, especially among the larger families. Also within Chloropidae the differences are substantial. Most representatives of

Siphonellopsinae have a relatively small, cylindrical often incurved abdomen, but in some genera (*Siphonellopsis*, *Siphonellopsina*) it is relatively large, oval or ovoid. As has been mentioned in connection with the general body shape, unusually long and slender (*Mepachymerus*) or short and broad (*Formosina*) abdomens exist. In the ground-plan condition of Chloropidae there are four discrete terga, i.e. the syntergum 1+2, and tergites 3, 4 and 5. Their lateral margins are more or less broadly reflexed so that they cover the lateral and partly the ventral surface of the abdomen. These reflexed parts normally turn over smoothly but in some cases (*Aphanotrigonum*) a sharp margin has developed between the dorsal and lateral parts; the latter in some species having become almost detached as separate sclerites. On the basal part of T_{1+2} there is normally a transverse desclerotized area. In a few very aberrant genera the T_{1+2} is very specialized. In *Sepsidoscinis* this complex is long and narrow with a median desclerotized area along its whole length (fig. 37). In *Anatrichus* and *Myrmecosepsis* T_{1+2} has become enlarged and heavily sclerotized and covers the whole abdomen dorsally. Nartshuk (1964), discussing the phylogenetic relations of *Anatrichus*, considered that T_3 is incorporated into this dorsal shield. I think this view is incorrect because T_3 is present, narrow but discrete, in the female of *Myrmecosepsis* and also in *Anatrichus* I have found small lateral sclerites representing T_3 . They are similar to the rudiments of T_4 but are even smaller and with fewer bristles. In both male and female there are five sternites in the preabdomen. S_1 is always small, indistinct and strap-like. S_2-S_5 are discrete in the ground-plan, of moderate size, bearing bristles. The sternites may be more or less reduced, small and narrow, sometimes divided along the mid-line and disappearing as discrete sclerites, but usually a few of their bristles remain. In other cases the sternites are fairly large and broad and sometimes S_5 has become greatly enlarged (*Cetema* ♀).

Male postabdomen. Between T_5 and the epandrium there is one dorsal sclerite (fig. 15A) which on each side has two spiracles, sp_6 and sp_7 . This sclerite is considered to represent the inversed sternites 7+8. Two pairs of short bristles arising from large sockets are present on this sclerite in some Siphonellopsinae (*Siphonellopsina*, *Protohippelates*, figs 24, 23). Most probably they represent the *sensilla trichodea* and thereby support the view that

this dorsal sclerite is composed of the fused sternites 7 and 8. Griffiths (1972) studied the male postabdomen of *Lasiopleura shewelli* Sabrosky (Siphonellopsinae) and found two oblique ventral sclerites, interpreted by him as S_6 and S_7 . Consequently he considered that the dorsal sclerite represents sternite 8 only. As mentioned above (p. 21) I consider that the ventral sclerites are S_5 and S_6 and that the dorsal sclerite in *Lasiopleura* is composed of S_7 and S_8 as in other chloropids.

The ground-plan condition for the epandrium and its appendages is obviously that prevailing among the families of the Chloropidae family group and which is also common elsewhere within Schizophora, namely a bowl-shaped epandrium with discrete but basally fused cerci, simple surstyli, and one distinct ventral epandrial sclerite, articulating with the hypandrial corni. The epandrium may be long and cylindrical (*Parahippelates*), fused ventrally (*Desertochlorops*) or with the postero-ventral or postero-dorsal corners strongly projecting (many Siphonellopsinae resp. *Anthracophagella*, *Cetema*). The cerci have become fully fused into a mesolobus in Chloropinae. Secondary sclerites may be present lateral of the anus (*Globiops*) or they may become more or less united with the surstyli forming the upper lobe of the surstylus (*Diploptoxa*). Ventrally to the main (middle) lobe of the surstylus a lower lobe is often developed, more or less fused with the ventral epandrial sclerite and united with the hypandrial cornus (*Chlorops*). Heavily sclerotized bars in these lobes are similar to the "connecting rods" of Muscoidea s. str. The middle lobe of the surstylus is primarily simple, narrow and pointed. Secondly it can be bi-lobed (*Sepsidoscinis*, *Siphonellopsina*), broad and blunt (*Meromyza*) or granulated (*Cryptonevra*). The surstyli can become fused with the epandrium (*Assuania*).

The hypandrium is moderately broad but usually has distinct projections on the anterior margin, which project, lateral of the phallapodeme, into the body cavity. The hypandrial corners are fused with each other behind the aedeagus to form a ring. This state is commonly present among the Siphonellopsinae and Oscinellinae and probably represents the ground-plan condition, while the long hypandrial corners united with the lower lobes of the surstyli are derived. The free anterior end of the phallapodeme is longer or shorter, cylindrical, or distinctly flattened (*Meromyza*). The phallapodemic sclerite is usually narrow but

sometimes large and trough-shaped (*Capnoptera*).

In the ground-plan condition the postgonites are relatively short, situated lateral of basiphallus and equipped with a few bristles and some small sensilla (*Siphonellopsis*). They have developed into curved, (*Dactylothyrea*), hook-like (*Cetema*) or serrated structures (*Lipara*) or long sclerites more or less fused with the phallapodemic sclerite (*Anthracophaga*). The pregonites primarily lead from the postgonites to the hypandrium and they can become more intimately fused with the postgonites so that the limits between them are indistinct. Sometimes their connection with the postgonites is lost and they become displaced laterally (*Chlorops*).

The basiphallus is usually short and simple but in some Siphonellopsinae it is well-developed and, in a few cases, has developed strong toothed sclerites (*Scoliophthalmus*). The distiphallus is usually short and membranous but sometimes it is developed into more definite structures for instance long and cornet-like (*Thaumatomyia*).

The ejaculatory apodeme is normally present but it is very small (*Javanoscinis*, *Sepsidoscinis*) and of simple structure, very few descriptions of it have appeared in the literature.

On the male abdomen there are sometimes large eversible pouches which probably contain pheromone-producing glands. *Formosina* (fig. 91) has three pairs of lateral pouches. *Chloropisca*-species (fig. 90) have large pouches between segment 5 and the hypopygium. Similar structures have also been described in *Fiebriella* (Hennig 1941) and *Polyodaspis* (Nartshuk 1964).

The female postabdomen, in the ground-plan condition, has a long retractile ovipositor with T_6 — T_8 and S_6 — S_8 more or less reduced, and often parted along the mid-line (fig. 16). Sometimes the ovipositor is very short (*Meromyza*) or flattened and, in certain areas, more heavily sclerotized (*Calamoncosis glyceriae* Nartshuk, *Pseudopachychaeta heleocharis* (Nartshuk)).

The vast majority of chloropid species are phytophagous; larvae especially infesting Poaceae, grasses, but they are also numerous on Cyperaceae and Juncaceae and a few other monocotyledonous plants. Some chloropids are saprophagous, predatory on other insect larvae or aphids, or are parasitic on the eggs of cicadas, orthopteroid insects or spiders. Nartshuk (1972 a, b) has studied the evolutionary trends of the nutritional habits of Chloropidae.

Although nothing is known about the food habits of Siphonellopsinae larvae, the ground-plan condition for Oscinellinae and Chloropinae seems to be that the larvae are phytophagous on monocotyledonous plants. Many species of Oscinellinae (*Elachiptera*, *Conioscinella*, *Aphanotrigonum*) develop saprophagously in the detritus produced by other phytophagous insects, including the formed by phytophagous chloropids. Facultative predatory habits have developed from this way of life and this in turn has led to obligate predation and parasitism. The predatory or parasitic habits have developed independently in various lines in both Oscinellinae and Chloropinae.

Description of the hypothetical stem species of Chloropidae

Head with no sexual differences between male and female. Arista slender, relatively long, bare or shortly pubescent, with three segments. ant_1 very small. ant_2 short, cup-shaped, with a row of short bristles along the dorsal and outer lateral edge, dorsally with a strong erect and slightly out-curved bristle, ventrally with a long, straight bristle. ant_3 relatively small, flat, rounded or somewhat longer than broad with short pubescence. Eyes of moderate size, rounded oval or somewhat kidney-shaped due to a concave posteroventral margin, with oblique long axes. Frons broad, somewhat narrower in front, with a large, distinct frontal triangle, reaching at least to middle of frons and posteriorly covering at least 2/3 of the posterior width of frons. Frons outside the triangle uniform without differentiated sclerites, thus upper orbital plates and interfrontal lists not visible. The following head bristles are well developed: *pvt* erect, convergent or cruciate; *vte* outcurved; *vti* incurved; *oc* divergent, procurved; 3 *orb* (probably *ors*), the posterior outcurved and recurved, the two anterior outcurved and procurved; a few pairs of *if* incurved; on frons various *fr*, mostly procurved; one anterior central pair stronger, procurved and incurved *fr*, which possibly is the most anterior pair of *if*. Between *vte* and *pvt* a few procurved and incurved bristles. Behind the eye a row of postocular setae. Jowls (genae) rather broad with at least one row of bristles. One long, straight posterior *pst*. One distinct *vi*. Face flat, between the antennae probably a short indistinct, triangular carina. Palpi cylin-

drical, slightly upcurved, with some bristles. Proboscis short, retractile.

Thorax with no differences between male and female, completely dusted with distinct, curved hairs and bristles of the type generally occurring within the Schizophora. Humeri with one lower posteriorly curved *h*. Notopleura with 1 *a npl* and 1 *p npl*. Mesonotum with well-developed transverse suture. *acr* rather long in two or more somewhat irregular rows; the posterior pair distinctly longer. *scp* short but distinct. 1 presutural *dc* and 3 postsutural *dc*. 1 *prs*; 1 *sa*; 1 *a pa*; 1 *p pa*. Relatively few hair-like small bristles, especially on humeri, between *prs* and *dc* and between *sa* and *dc*. Scutellum shorter than long, not flattened, with long *ap sc* and 1 pair somewhat shorter *la sc*. On the disc, 1 pair of short hair-like bristles. Propleuron with well-developed carina. *prpl* with few bristles below. *mpl* with few short bristles. *ptpl* and *hpl* naked. *stpl* with 1 *stpl* and some hairs, especially below. Halteres normal. Wings moderately long and broad, hyaline without distinct colour pattern. Costa (c) broken at tip of *sc*, reaching r_{4+5} . Subcosta (sc) reduced but distinct, at least in basal part. r_1 , r_{2+3} , r_{4+5} , m_{1+2} , m_{3+4} , t_a and t_p distinct. t_b and anal cell absent. Anal vein present at most as indistinct remains or fold. A distinct inflexion at middle of basal segment of m_{3+4} . Tegula with 3 bristles. Basicosta with 2 bristles at apical end, the (upper) dorsal longer. Legs rather long and slender, dusted with irregular hairs or small bristles. Claws and pulvilli well-developed. Tarsal segments slender with bristles at the apical ends. Pre-apical *d* not present. t_2 with 1 (or possibly 2) straight apical *v*. t_3 with an oval tibial organ ("sensory area") on the postero-dorsal surface, and 1 apical, curved *av* spur, mt_3 slender.

Abdomen rather narrow, dusted or shining with moderately-sized hairs or small bristles. Tergites large, laterally broadly infolded. Sternites 1—5 of medium size.

Female ovipositor long and slender, retractile, with small tergites and sternites.

Male T_6 and T_7 lost. S_6 reduced and displaced laterally, reaching left margin of the almost symmetrical, dorsal synsternum S_7+S_8 . Postgonites small. Pregonites uniting postgonites and hypandrium. Distiphallus membranous without pubescence. Cerci discrete, united postero-medially. Epandrium bowl-shaped. Surstyli simple. Ventral epandrial sclerite simple, united with the fused hypandrial corni.

Larvae phytophagous, attacking monocotyledonous plants.

Rejection of Griffiths' "periandrial theory"

The ground-plan condition of the male genitalia of Diptera is represented by a state with one dorsal and one ventral sclerital complex basally articulating with each other.

The dorsal complex forms a flap composed of T_9 , T_{10} , S_{10} , the cerci and the supraanal and subanal sclerites (T_{11} , S_{11}), which at rest covers the dorsal cavity of the ventral complex like a lid. The ventral complex is composed of S_9 , the parameres (sensu Snodgrass 1957) and the aedeagus.

The male genitalia in Diptera are subject to many kinds of transformations. Sclerites can become divided or fused with each other in many different combinations, or structures can become strongly reduced or even lost while others are new acquisitions.

In Diptera true macrotrichia, macrochaetae, arising from alveolar sockets seem to be originally present only on discrete sclerites on the outer body wall. Sometimes they are present on the membrane (inter-segmental membrane) due to reduction of the original sclerites, as is the case in connection with the reduction of the sternites in some chloropids. Microtrichia are commonly present both on sclerites and membranes. On secondary outgrowths, such as the distiphallus, etc., there commonly are hairs or more or less stout spines but these are always normal or enlarged microtrichia or secondary structures (spines) not homologous with macrotrichia.

There are in most cyclorrhaphous families two pairs of sclerites, usually equipped with macrotrichia inserted between the base of the phallus and the hypandrium. They are termed pregonites and postgonites (Crampton 1942). In most orthorrhaphous Diptera (Stratiomyidae, Tabanidae, Therevidae, Scenopinidae, Bombyliidae) (and in many Nematocera, e.g. *Tipula*, *Ptychoptera*) there are paired outgrowths from the base of the aedeagus. Snodgrass (1957) refers to them as paraphyses and he suggests that the gonites could be derived from them. Griffiths (1972) has accepted that the postgonites are paraphyses in the meaning of Snodgrass and that the pregonites in Calyptratae (based on information from Black 1966)

are also paraphyses. He rejects the idea that the gonites emanate from S_9 . For the so called pregonites in other groups than Calyptratae Griffiths leaves the possibility open that they might be of a different origin. However, because the paraphyses in lower Diptera (Nematocera; Orthorrhapha) always lack macrotrichia I doubt that the gonites can be derived from those secondary structures. Snodgrass (1957) considers the ventral biarticulated claspers of Nematocera and Orthorrhapha, inserted posterior or lateral of S_9 , to be parameres. This view is accepted by Griffiths (1972).

The terminal dorsal sclerite in cyclorrhaphous males (the epandrium) has commonly been accepted to be T_9 . The dorsal claspers of the genitalia of these flies are then considered to be secondarily detached from T_9 and accordingly termed surstyli or edita. Griffiths (1972) has put forward the theory that the epandrium is not built up by T_9 but by the fused basal parts (basimeres) of the parameres, and that the claspers in Cyclorrhapha are the telomeres (distimeres). The epandrium is therefore named the periandrium. In orthorrhaphous groups (e.g. Asilidae), where the basimeres have become inserted between S_9 and T_9 the dorsal margins of the basimeres articulate with the outer basal corners of T_9 and the outer basal corners of the ventral side of the proctiger, corresponding to S_{10} . When T_9 , T_{10} and S_{10} is lost (but not the cerci) the same margins of the basimeres as have been united both with T_9 and S_{10} become fused dorsally according to Griffiths' theory. At the same time the ventral wall of the proctiger (S_{10} , S_{11}) is replaced with a secondarily developed "interparameral" sclerite. Furthermore the hypandrial corners develop and unite with this interparameral sclerite or with the bases of the distimeres (telomeres).

Since the true nature of the gonites and of the interparameral sclerites has not been convincingly demonstrated I am for the moment not prepared to accept Griffiths' interpretations as proven, and will continue to use the conventional terms epandrium and surstyli. I think the cyclorrhaphous epandrium and associated structures more likely originate from the same structures as the dorsal part of the genitalia of the orthorrhaphous Diptera, an interpretation that also explains the nature of the gonites and their macrochaetae. The situation within Scenopinidae could give some idea of the evolutionary pathways (fig. 20). In *Scenopinus fenestralis* L. and *S. niger* de G.

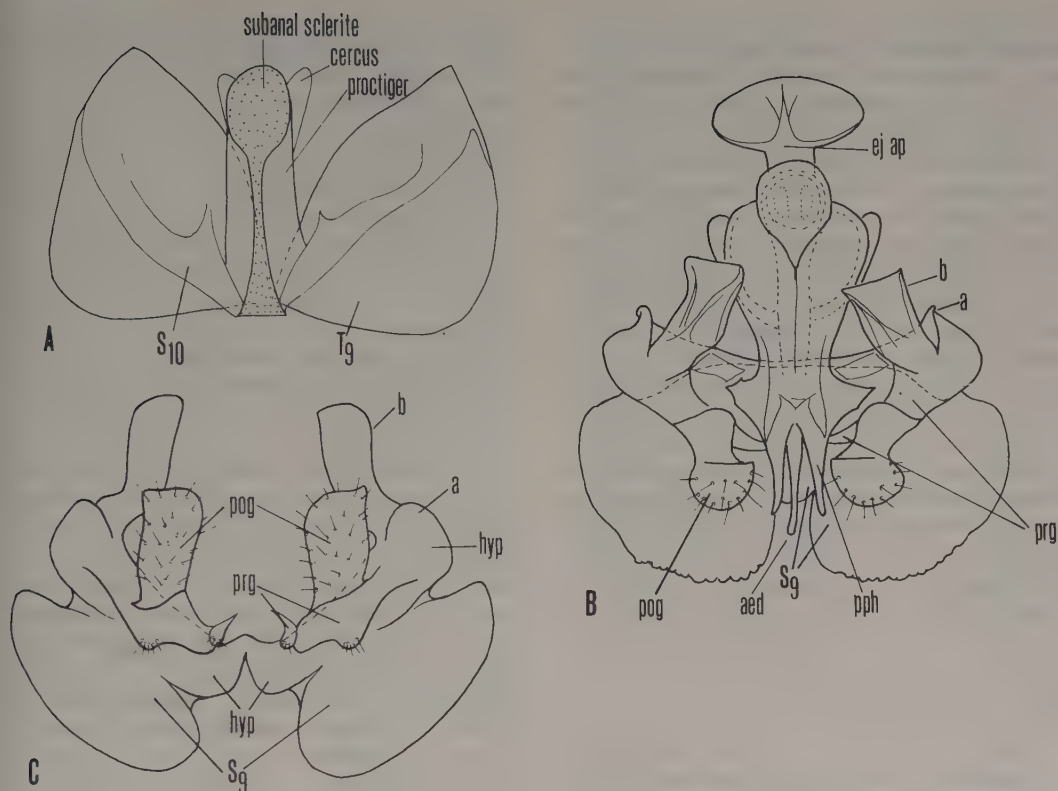


Fig. 20. Male genitalia of *Scenopinus fenestralis* (Linnaeus). — A. Dorsal part in ventral view. — B. Ventral part in dorsal view. — C. Ventral part in posterodorsal view, aedeagus removed. — a = articulation of S_9 with T_9 . b = hypandrial cornus articulating with ventral epandrial sclerites (S_{10} and subanal sclerite).

S_9 (like T_9) is apically bilobed but basally forms a hypandrial arch that laterally articulates with T_9 . Near these articulations there are large inwardly directed apodemes corresponding to the hypandrial corni of *Schizophora*. United with the lateral parts of the hypandrium are structures which are most likely the basimeres, and they bear articulated apical lobes, the telomeres. These parameres are situated on either side of the aedeagus, that has paired paraphyses. Both the basimeres and telomeres bear macrochaetae and correspond well with the pregonites and postgonites in *Schizophora*. On the ventral side of each part of T_9 there is a discrete sclerite, articulating apically with T_9 , basally with the basal end of a central sclerite (the subanal plate, S_{11}) and the hypandrial corni. These sclerites correspond to S_{10} in other *Orthorrhapha* which have become divided in connection with the division of T_9 . The ventral sclerite on the epandrium of *Cyclorrhapha*, articulating with the surstyli and the

hypandrial corni has sometimes been regarded as S_{10} , which has been rejected by others, e.g. von Emden and Hennig (1956).

Taxonomy and classification of Chloropidae

FAMILY CHLOROPIDAE RONDANI, 1856

Synonymy: Oscinidae Fallén, 1820 (as Oscinides); Rondani 1856 (as Oscinina).

Chloropidae Rondani, 1856 (as Chloropina).

Mindidae Paramonov, 1956 (Sabrosky 1964).

Echiniidae Paramonov, 1961 (Sabrosky 1964).

Diagnosis. Due to the numerous exceptions (= aberrant species with strongly apomorphic characters) it is not really possible to provide a diagnosis which embraces all species and which allows for accurate identification. The symbol (!) will be used to indicate such exceptions. Most forms can be identified with help of the following characters. Frontal triangle

well-developed (!), *if* present at or on the frontal triangle. *oc*, *pvt* (convergent (!)), *vti*, and *vte* present (!), *ori* absent. Discrete supra-orbital and intrafrontal sclerites absent. Propleuron with anterior carina (!). Preapical dorsal bristle on tibiae absent (as other bristles, except apical or subapical spurs on t_2 and t_3). Costal break at tip of *sc* (!). *sc* reduced, incomplete. Cross vein t_b absent. Anal cell absent, at most its posterior margin present as a fold. Anal vein absent. Flexure on subapical section of m_{3+4} present (!). Preabdomen with four distinct tergal sclerites (!). T_6 and T_7 lost in male. One sclerite, enclosing two spiracles on either side, between T_5 and epandrium in male. Distiphallus usually short, without pubescence.

The ground-plan condition for the family has already been outlined in the description of the hypothetical stem-species (p. 43). General evolutionary trends have also been treated in the description of the character transformation series (p. 30).

Key to subfamilies

1. *orb* 3, outcurved or procurved. *vti* stronger than *vte*. *if* few, 1—3. 1 recurved and 1 incurved *h*. 1 *stpl*. 1 *la sc* closer to anterior margin of scutellum than to *ap sc* *Siphonellopsinae*
- *orb* numerous, if few then upright or recurved. *vte* stronger than *vti*. *if* more numerous. 1 recurved or no distinct *h* present. No *stpl*. Usually more *la sc*, if only one then this *la sc* closer to *ap sc* than to anterior margin of scutellum 2
2. Costa reaches r_{4+5} (except some *Dicraeus*). Cerci in male apically free *Oscinellinae*
- Costa not reaching r_{4+5} . Male cerci completely fused, forming an almost rectangular sclerite *Chloropinae*

SUBFAMILY SIPHONELLOPSINAE DUDA, 1932

Synonymy: Palaeoscinellinae Duda, 1930: 56, p. p. (invalid).

Hippelatinae Duda, 1930: 44, p. p.

The subfamily Siphonellopsinae is characterized by the following features: 3 strong, procurved or outcurved *orb*. An unusually strong, straight posterior *pst*. 1 incurved and 1 recurved *h*; 1 *p npl*; often more than one *dc* in various combinations, at most 1+3 *dc*; often 1 *prs*; sometimes 1 small *pra*; often 1 *sa*; 1 *la sc* placed closer to mesonotum than to *ap sc*;

usually only 1 discal *sc*; usually 1 *stpl*. Costa reaching m_{1+2} ; basicosta with 1 unusually strong bristle; sometimes visible remains of t_b . Epandrium often with posteroventral corni. Cerci fused, often with a pair of very long bristles. Basiphallus usually large and broader than distiphallus. Asymmetry present in the pregenital segments in males. S_5 often reduced, sometimes slightly assymmetrical. S_6 present as small indistinct sclerite more or less fused with S_{7+8} . S_{7+8} often large and with 2 pairs of sensilla trichodea.

The subfamily Siphonellopsinae has a wide distribution: South America, North America, southern Europe, Africa and the Oriental and Australian Regions. Especially New Guinea and Australia seem to be rich in species of various types. Eleven genera or subgenera have been described, many of them have later been synonymized. Many characters in Siphonellopsinae have a wide range of character states. At present very dissimilar species are lumped into the same genus. I am convinced that later, when the groups has been better worked out and the male genitalia have been studied, a considerable increase in the number of valid genera will follow.

Key to genera (males)

1. Spur on t_3 distinct. Epandrium with well-developed ventral corni 2
- Spur on t_3 absent or very small. When epandrium with ventral corni then thoracal bristles very short, spinous 3
2. Epandrium large, conical. Mesolobus longer than broad. Ventral epandrial sclerites rod-shaped. S_{7+8} relatively long. Fig. 23 *Protohippелates* n. gen.
- Epandrium semisphaerical. Mesolobus broader than long. Ventral epandrial sclerite broad. S_{7+8} very short. Fig. 22. *Parahippelates* Becker
3. All thoracal bristles well developed. 1—3 *dc*. *prs*, *pra*, *sa* present. Pregonites short. Figs 8 B, 9 A, 10 A, 11 A, 21 *Lasiopleura* Becker
- Thoracal bristles partly reduced. (1)+1 *dc*. No distinct *prs*, *pra* or *sa*. Pregonites long 4
4. Thoracal bristles long. Scutellum normal, rounded, convex with long *sc*. Epandrium without corni. Phallus minute. Figs 21, 24 .. *Siphonellopsina* n. gen.
- Thoracal bristles short. Scutellum very short and flat with short *sc*. Epandrium with projecting corni. Phallus large, differentiated into a large basiphallus and a membranous distiphallus. Fig. 25 *Siphonellopsis* Strobl

The number of genera in this study is far too low to allow any grouping into tribes, genus groups etc. However, in many respects the genus *Lasiopleura* Becker is the most plesiomorphous. It has almost all the head and thoracic bristles that can be present in a schizophorous fly. Within the subfamily there are reductions of the bristles of various degrees anticipating the situation in Oscinellinae and Chloropinae.

Lasiopleura has simple surstyli, discrete, short postgonites and short pregonites, a large, broad basiphallus and a slender distiphallus, which are all features close to the ground-plan condition of Siphonellopsinae. The epandrial corners are reduced.

Parahippelates Becker and *Protohippelates* n. gen. have almost as well-developed bristles as *Lasiopleura*. They have epandrial corni, a plesiomorphous feature like the complex phallus. They differ from each other and from *Lasiopleura* especially in the build of the epandrium.

Both *Siphonellopsina* n. gen. and *Siphonellopsis* Strobl show similarities in the short postgonites and long pregonites and in the reduction of certain bristles. *Siphonellopsis* has a complex phallus and epandrial corni but is more apomorphous in the reduction of the bristles. *Siphonellopsina* is intermediate in the reduction of bristles but has lost the epandrial corni and almost the phallus. It is possible that the gonites, the phallapodeme and the phallapodemic sclerite here act as a pseudophallus in the same way as in *Diploptoxa*.

Genus *Lasiopleura* Becker, 1910: 130

Figs 8 B, 9 A, 10 A, 11 A, 21, 112 A.

Type species: *Oscinis longepilosa* Strobl, 1893.

Synonymy (according to Sabrosky 1941, 1964):

Pseudohippelates Malloch, 1913: 261, type species: *Hippelates copax* Coquillett, 1898; *Omochaeta* Duda, 1930: 59, type species: *Oscinosoma specularifrons* Enderlein, 1911; *Oscinelloides* Malloch, 1940: 267, type species: *Oscinella bispinosa* Becker, 1911.

Head squarish with jowls, face and front of frons yellow and other parts black. Eyes of moderate size, slightly kidney-shaped with oblique long axes, covered with sparse short or very short hairs. Frons somewhat projecting and somewhat longer than broad, narrower in front. Frontal triangle broad behind, reaching the middle or 2/3 of front, with convex side

margins, shining or faintly dusted, then subshining. Head bristles well developed. Frons with up to 10–15 *fr*, the anterior middle pair distinctly longer than the others. *if* few, in one row outside the margin of the frontal triangle. 3 *orb*, the anterior procurved, the middle outcurved, the posterior slightly out- and recurved. *oc* long, divergent. *pvt* long, cruciate, *vii* long, incurved, *vte* long, outcurved. One row of postocular bristles. One long, straight *pst*. Jowls about as broad as *ant*₃, with a shining ridge below, and one row of distinct bristles. One long *vi*. Proboscis short. Palpi narrow, cylindrical. Face concave. *ant*₃ rounded, flat. Arista with short pubescence. *ant*₂ with a distinct out- or even recurved bristles.

Thorax with exceptions of small parts/spots, completely dusted. Thoracic bristles long and distinct. 1 incurved and 1 recurved *h*. 1 *a npl*, 1 *p npl*, 1 small *pra*, 1 *prs*, 1 *scp*, 1 presutural *dc*, 3 postsutural *dc*, 1 *sa*, 1 *a pa*, 1 *p pa*. One row of bristle-like *acr* the posterior separated. Scutellum normal, rounded with very long *ap sc* and one long *la sc*. One pair of distinct discal *sc*. Pleura dusted all over, except anterior part of *stpl* and the area below *sp*₁. 1 relatively short *stpl*.

Legs slender. *t*₃ with a narrow tibial organ.

Wings of Oscinellinae-type, uncoloured or somewhat brownish. Basicostal bristle very long. Halteres yellow.

Abdomen relatively short, narrow, cylindrical or somewhat flattened. Male cerci basally fused, long. Surstyli simple. Epandrium without ventral corni. Hypandrial corni fused. Postgonites short, with two distinct bristles and a median point. Pregonites short. Basiphallus large and broad. Distiphallus long. Male *S*₅ distinct, symmetrical. *S*₆ large, in a lateral position.

Distribution: Unclear due to lumping of several taxa. I have seen *Lasiopleura* s. str. from Europe and the Oriental Region.

Material studied: *Lasiopleura longepilosa* Strobl; *L. zeylanica* Lamb, 1918.

Genus *Parahippelates* Becker, 1911: 109

Fig. 22.

Type species: *Oscinis pulchrifrons* de Meijere, 1906.

Length about 4 mm.

Head large, yellow, partly grey behind, broad as thorax, squarish in side view. Bristles on frons and vertex long and black. Eyes narrow oval with oblique long axes, sparse

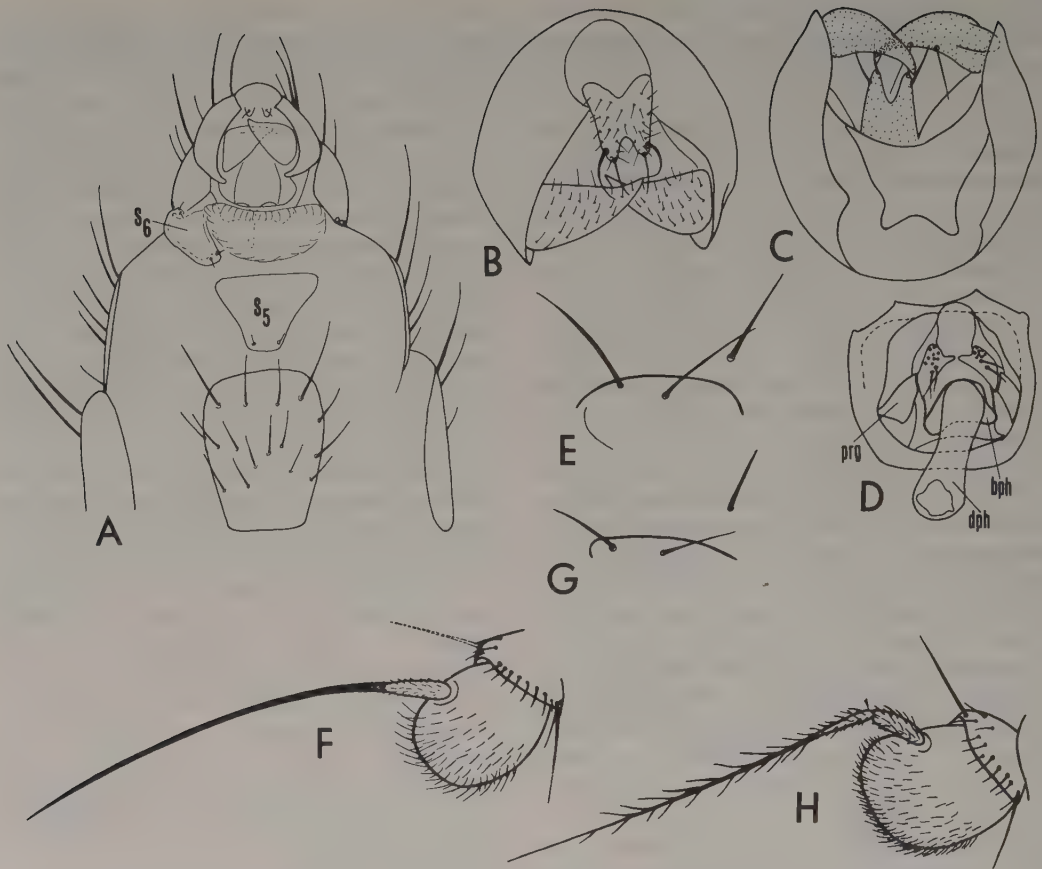


Fig. 21. — A—D. *Lasiopleura longepilosa* Strobl. — A. Tip of abdomen, ventral view. — B. Epandrium, oblique posterior view. — C. Epandrium, oblique ventral view. — D. Genitalia, ventral view. — E—F. *Siphonellopsina kokagalensis* n. sp. — G—H. *Siphonellopsina obscuripennis* (de Meijere). — E, G. Humerus and *a npl*. — F, H. Male antenna, outer side.

short hairs and anterior ommatidia larger than the posterior. Jowls broad, broader than half the height of eyes, dusted with numerous pale hairs. Vibrissal angle somewhat retreating. 1 dark *vi*, above that one smaller pale bristle. Cheeks distinct. Frons somewhat projecting, longer than broad, distinctly narrower in front than behind, yellow, at sides of frontal triangle velvety black, with some *fr*, the central pairs stronger and forming two rows. Frontal triangle behind broad as $\frac{3}{4}$ of frons, with straight side margins reaching middle of frons, greyish, smooth, heavily dusted in grey. *if* indistinct from *fr*, placed distinctly outside the triangle. *oc* long, procurved, divergent. *pvt* almost as strong as *oc*, upright convergent. *vii* strong, incurved. *vte* outcurved. 3 stronger, pro- and slightly outcurved *orb*. One row of distinct black postocular hairs behind the eyes. Face

long, narrow, somewhat retreating. Facial carina short and indistinct, not reaching below the antennae. Clypeus small, yellow, shining. Proboscis rather long, shining brownish. Palpi yellow, large, laterally compressed, curved, with two strong black bristles. Antennae yellow. *ant*₂ short with distinct dorsal bristle. *ant*₃ rounded, higher than long, distinctly pubescent. Arista dark, rather thickly pubescent.

Thorax relatively long and narrow but deep, black or brownish below, very heavily dusted all over. Bristles and hairs black, the ventral ones pale. Humerus with numerous hairs and 1 recurved and 1 incurved *h*. Mesonotum moderately convex, smooth, striped with grey and brown dust. The brown dust present in three longitudinal stripes, one along *acr* line and one along each outer margin. Bristles and hairs distinct, 1 *a npl*, 1 *p npl*, 1 rather short

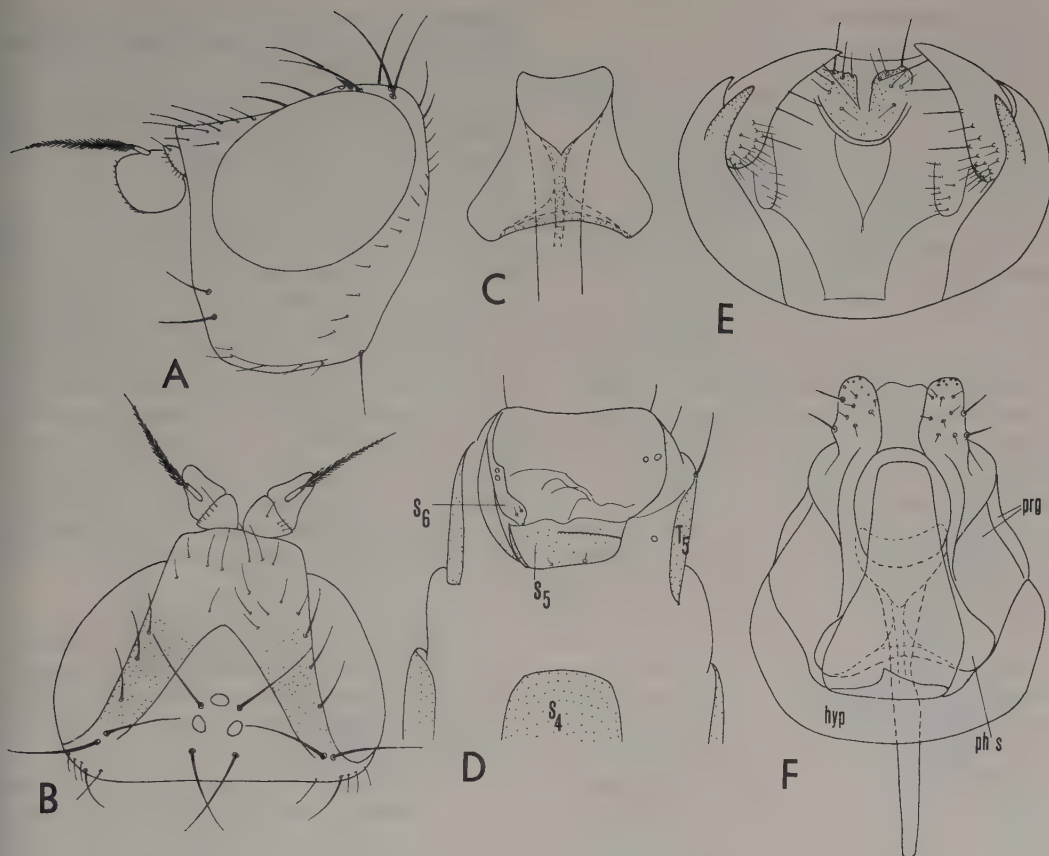


Fig 22. — A—F. *Parahippelates pulchrifrons* (de Meijere). — A. Head, lateral view. — B. Head, dorsal view. — C. Phallapodemic sclerite and posterior end of phallapodeme, ventral view. — D. Apical end of male abdomen, except phallic complex and epandrium, ventral view. — E—F. Male genitalia, ventral view.

prs, 1 small *pra*, 1 small *sa*, a *pa* and *p* *pa* strong, 1+3 *dc*, the anterior rather short. *acr* strong in two indistinct rows, more or less parted. Scutellum rounded, somewhat flattened, smooth, dusted in grey. *ap sc* longer than scutellum. 1 long *la sc*. 1 hair on the disc. Pleura smooth, with grey dust. *prpl* with a group of upcurved hairs or small bristles in the anteroventral corner. *mpl* without hairs. *stpl* with 1 dark *stpl* and covered with numerous pale hairs.

Legs rather long and stout, including coxae, yellow with dark or pale hairs. Tibial organ narrow. Spur on t_3 about as long as width of t_3 .

Wings relatively short, greyish with dark veins. mg_1 : mg_2 : mg_3 : mg_4 =35: 45: 23: 9. t_a inside of tip of r_1 . t_a — t_p longer than t_p . Angle

between t_p and second segment of m_{1+2} about 90° . The extension of t_p cuts mg_2 . t_a at middle of discal cell. An indistinct fold from the flexure of m_{3+4} , directed slightly inwards, cutting m_{1+2} slightly proximal of t_a present as the rests of t_b . r_{4+5} and m_{1+2} slightly convergent. Halteres yellow.

Abdomen short, cylindrical, pale brownish, dusted, with numerous, rather long dark hairs. Epandrium short, rounded. Cerci not fused. Surstyli simple, pointed. Postgonites projecting behind base of phallus. Pregonites large. S_5 in male rather distinct. S_6 at left side, partly fused with S_{7+8} .

Distribution: New Guinea.

Material studied: *Parahippelates pulchrifrons* (de Meijere), male syntype.

Genus *Protohippelates* n. gen.

Fig. 23.

Type species: *Parahippelates brunneipennis* de Meijere, 1913.

Large, 5 mm, reddish-brown species with brownish wings, anteroventral spur on t_3 and large conical epandrium.

Head squarish, higher than long, reddish-brown, dusted, with long, dark hairs and bristles. Eyes oval with oblique long axes, naked. Jowls broad, broader than ant_3 , covered with long hairs. vi long. Vibrissal angle rounded. Cheeks broad. Frons not projecting, as long as broad behind, in front distinctly narrower, dusted with numerous long fr , and one pair of long bristles in the middle near anterior margin. Frontal triangle behind broad as $2/3$ of frons with sinuous side margins reaching middle of frons, reddish brown, smooth, dusted. if indistinct. oc and vertical bristles very long and stout, subequal. oc procurved and divergent. pvt cruciate, vti incurved, vte outcurved. 3 procurved strong orb , between them a few smaller procurved bristles. pst long. Face narrow, slightly concave with white dust. Facial carina distinct in upper part, reaching about middle of face. Clypeus yellow. Palpi yellow, cylindrical, with dark bristles. Proboscis well developed. Antennae yellow. ant_2 short with distinct setae. ant_3 squarish, higher than long, with distinct pubescence and sensory pit on outer side. Arista with yellow, pubescent basal segments. Flagellum slender with long erect hairs.

Thorax reddish brown, dusted, without distinct spots and with long, dark bristles and hairs. Humerus hairy with 1 incurved and 1 recurved h . Mesonotum moderately convex with distinct transverse suture, smooth. acr long, in parted, double row: 1 prs , 1 $a npl$, 1 $p npl$, 1 pra , 1 $a pa$, 1 $p pa$, 1+3 dc . psc very long, longer than posterior dc . Scutellum somewhat flattened, smooth. $la sc$ and $ap sc$ long. 2 pairs of discal hairs. Pleura smooth. mpl without hairs. Prosternum without hairs but with a group (3—4) of upcurved hairs present on $prpl$ at its junction to prosternum. $stpl$ with 1—2 $stpl$ and some pale hairs.

Legs long and stout. f_1 with a row of rather strong antero-dorsal bristles. t_3 with strong, curved, anteroventral subapical spur. Tibial organ narrow.

Wings brownish with dark veins. mg_1 : mg_2 : mg_3 : mg_4 = 10: 13: 8: 3. t_a distinctly proximal of tip of r_1 and of middle of discal cell. t_p

present as a distinct fold (fig. 23 H) from the flexure of m_{3+4} , thus confirming the opinion that this flexure indicates the site of the former t_b cross-vein. This also confirms that the stem species of Chloropidae had a relatively long posterior basal cell. Wings otherwise of Siphonellopsinae type.

Abdomen cylindrical, narrowing towards apex, brown, apically darker, dusted, with long dark hairs. Male epandrium long, conical. Cerci very long, fused medially. Surstyli simple. Anteroventral corner of epandrium strongly projecting, recurved. Ventral epandrial sclerite present as two long rod-shaped sclerites articulating against the not fused hypandrial corni. S_5 reduced, possibly present as a transverse sclerite. S_6 reduced, situated at the left side. S_{7+8} with two pairs of sensilla trichodea and on the left side a very strong bristle (fig. 23 G). Postgonites relatively large, pregonites small.

Distribution: New Guinea.

Material studied: *Protohippelates brunneipennis* (de Meijere), n. comb., male syntype.

Remarks. Duda (1934) synonymized *Parahippelates brunneipennis* de Meijere with *Parahippelates fuscipleuralis* Becker, 1911. Because I have not seen the types of *fuscipleuralis* Beck. I prefer to retain *brunneipennis* de Meij. as genus-type. *Protohippelates* n. gen. is similar to the type species of *Parahippelates* with respect to shape and chaetotaxy of head and thorax but the important differences in the male genitalia prevent their inclusion in the same genus.

Genus *Siphonellopsina* n. gen.

Figs 21, 24.

Type species: *Siphonellopsina kokagalensis* n. sp.

Medium size, 4 mm, black species with brownish wing, 1 dc , and minute phallus.

Head higher than long with large eyes and deeply depressed frons. Arista naked or hairy.

Thorax. 2 h , 1 $a npl$, 1 $p npl$, 1 $a pa$, 1 dc , 1 $ap sc$, 1 $la sc$, 1 $stpl$, all long and stout, other thoracal bristles small and indistinct. Pleura extensively covered with thick, felty white dusting.

Legs. Fore legs with black, stout, laterally compressed tibiae and tarsi.

Abdomen. Epandrium without corni. Mesolobus large with very long bristles. Middle lobe of surstylus simple or bifid. Hypandrium ring-

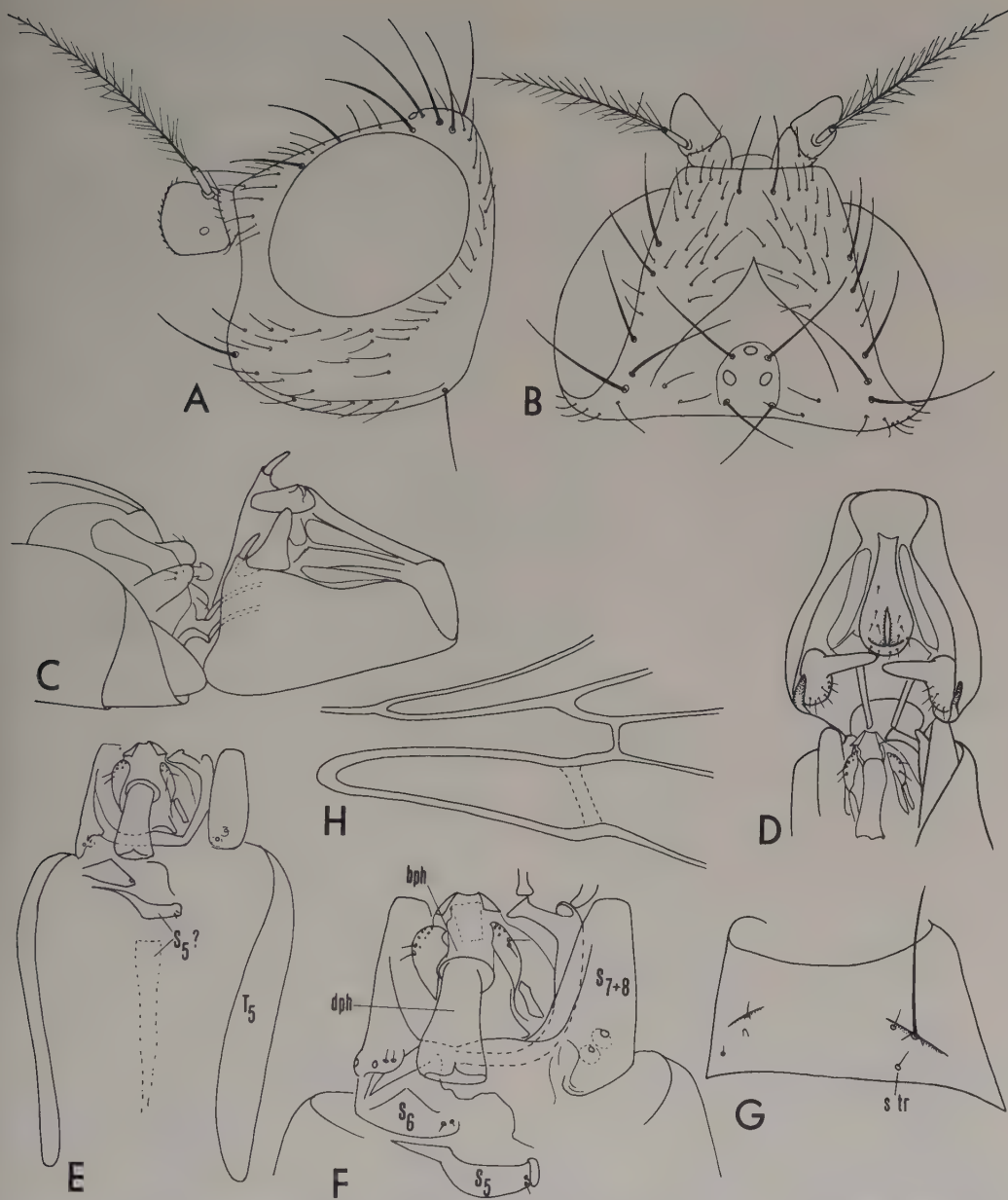


Fig. 23. — A—H. *Protohippelates brunneipennis* (de Meijere). — A. Head, side view. — B. Head, dorsal view. — C. Male genitalia, latero-ventral view. D—F. Ditto, various parts, ventral view. — G. Synsternum 7+8, oblique dorsal view, showing bristles and *sensilla trichodea*. — H. Basal parts of wing venation, showing t_p -fold. — Hairs and bristles on tergites and epandrium omitted.

shaped. Postgonites very small. Pregonites long. Phallus minute.

Distribution: Sri Lanka, Sumatra.

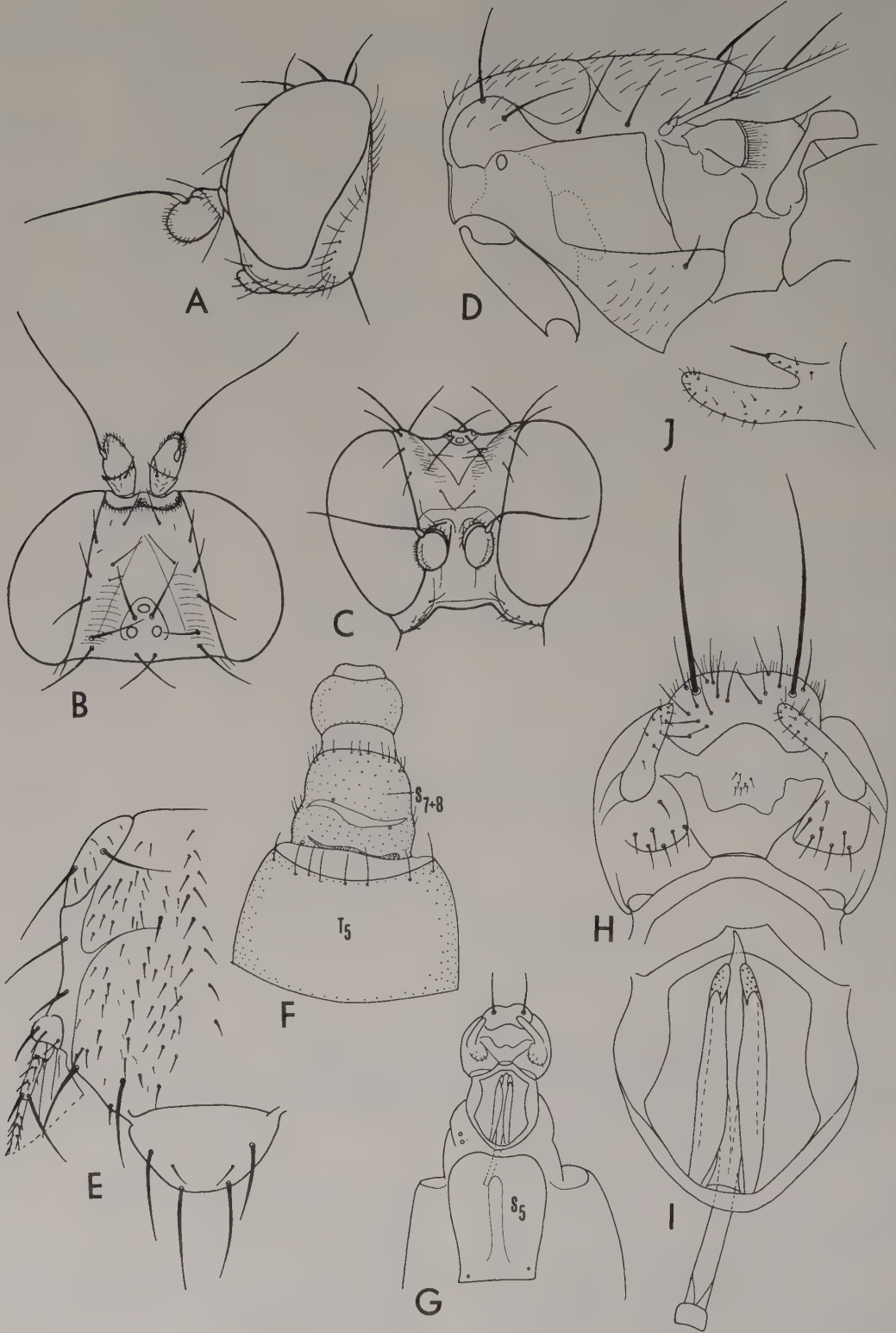
Material studied: *Siphonellopsina kokagalensis* n. sp.; *Siphonellopsina obscuripennis* (de Meijere, 1919) n. comb. (*Oscinella*).

Siphonellopsina kokagalensis n. sp.

Figs 21, 24.

Type locality: Sri Lanka, Eastern Province, Kokagala Mountains, 20 miles N of Bibile.

Holotype: Male: Ceylon (Sri Lanka), E. Prov-



ince, Kokagala Mountains, 20 mls N Bibile, 13.III.1962. Loc. 139. Swept above surface of small stream. Leg. Lund University Ceylon Expedition 1962, Brinck—Andersson—Cederholm.

Holotype in the Entomological Museum, Zoological Institute, University, Lund, Sweden.

Description. Male. Head higher than long; length 23, height 32. Eyes large with almost vertical long axes. Face straight, narrow, without carina, pale, with white dust. Frons narrow in front, width in front 14, behind 24, length 25. Width of head 45. Frons deeply impressed, anterior of frontal triangle brownish, shining, otherwise black, thinly dusted. Frontal triangle indistinct, reaching $3/4$ of frons, black, thinly dusted, subshining. One pair of procurved, convergent *fr*, one pair of pro- and incurved *if*. The anterior two pairs of *orb* procurved, posterior *orb* outcurved. The anterior *orb* long as *fr*, the posterior one a bit stronger. *oc* long, procurved, divergent. *vii* incurved and somewhat procurved. *vte* stronger than *vii* outcurved. *pvt* cruciate. One row of rather long postocular setae reaching the posterior peristomal bristle. Posterior peristomal bristle very long. Occiput and postgena black. Postgena with very thick silvery white dust. Jowls narrow, somewhat narrower than palpi, with one row of bristles, yellow with white dust. *vi* rather long. Palpi flat, curved, yellowish brown with black hairs. Proboscis short, black, shining. Clypeus narrow, black, shining. *ant*₂ yellowish brown, short, apically with a row of black bristles, dorsally with one stronger antennal bristle, below with one or a few long, straight bristles. *ant*₃ flat, long as broad, apically rounded with long white pile. The colour is yellow-brown, darkened especially on the outer side. Arista bare, basally thickened and brownish-yellow, apically black, very thin.

Thorax longer than broad, dorsally flat, black with silvery white, grey or brownish dust.

All bristles black. 1 strong incurved *h*, 1 strong recurved *h*. 2 strong *npl*, the anterior somewhat stronger. 1 strong *a pa*. 1 small *p pa*. 1 strong posterior *dc*, the dorsocentral line otherwise only bearing short hairlike bristles.

acr short, in two indistinct rows. Between the dorsocentral row and the margins of mesonotum a number of short hairs. The mesonotum is marbled with grey and brown dust. Scutellum rounded, black with brownish dust, *ap sc* and *la sc* strong. On the disc one short hair. *prpl* indistinctly dusted. The posterior part of *prpl* and the anterior part of *mpl* shining, *mpl* in posterior part with strong felty, white dust. *stpl* with short *stpl*, completely covered with thick felty white dust and numerous whitish hairs. Pleura otherwise with white dust.

Legs rather long. Forelegs with yellow-brownish coxae covered by thick white dust. Fore femora brownish, darkened towards tip. Fore tibia black with numerous, rather strong, black hairs. Fore tarsi black, or brownish black. *mt*₁ somewhat laterally compressed. Middle coxae yellowish. Middle femora basally yellowish, distally brownish. Middle tibiae brownish with white dust and black hairs. Middle tarsi yellow brown, darkened towards tip.

Hind coxae brownish. Hind femora somewhat thickened, in basal fourth yellowish, blackish brown, dusted with shining spots around the black hairs. Third tibia in the dorsal surface yellowish, otherwise brown. Tibial organ distinct, rather narrow. Hind tarsi yellow, the three apical segments darkened.

Wings heavily brownish, especially along the dark veins. The flexure of *m*₃₊₄ very distinct. *t*_a—*t*_p about twice as long as the apical end of *m*₃₊₄. *mg*₁: *mg*₂: *mg*₃: *mg*₄ = 38: 40: 29: 10. Halteres whitish, somewhat darkened at tip and shaft basally blackish.

Abdomen rather long and narrow, brownish black with thin grey dust, subshining, shining at sides. Sternites heavily dusted with white dust. Abdominal hairs rather short, black.

Epandrium without ventral corni. Male cerci fused, very large, with two long bristles. Middle lobe of surstylus simple. Hypandrial corni fused, articulating with the ventral epandrial sclerite. Postgonites very short. Pregonites long. Phallus extremely small and indistinct. Synternum *S*₇₊₈ long, on the middle divided by

Fig. 24. — A—J. *Siphonellopsina kokagalensis* n. sp. — A. Head, lateral view. — B. Head, dorsal view. — C. Head, anterior view. — D. Thorax, lateral view. — E. Thorax, dorsal view. — F. Apical part of male abdomen, dorsal view. — G. Ditto, ventral view. — H—I. Male genitalia, ventral view. — J. *Siphonellopsina obscuripennis* (de Meijere), right surstylus, lateral view.

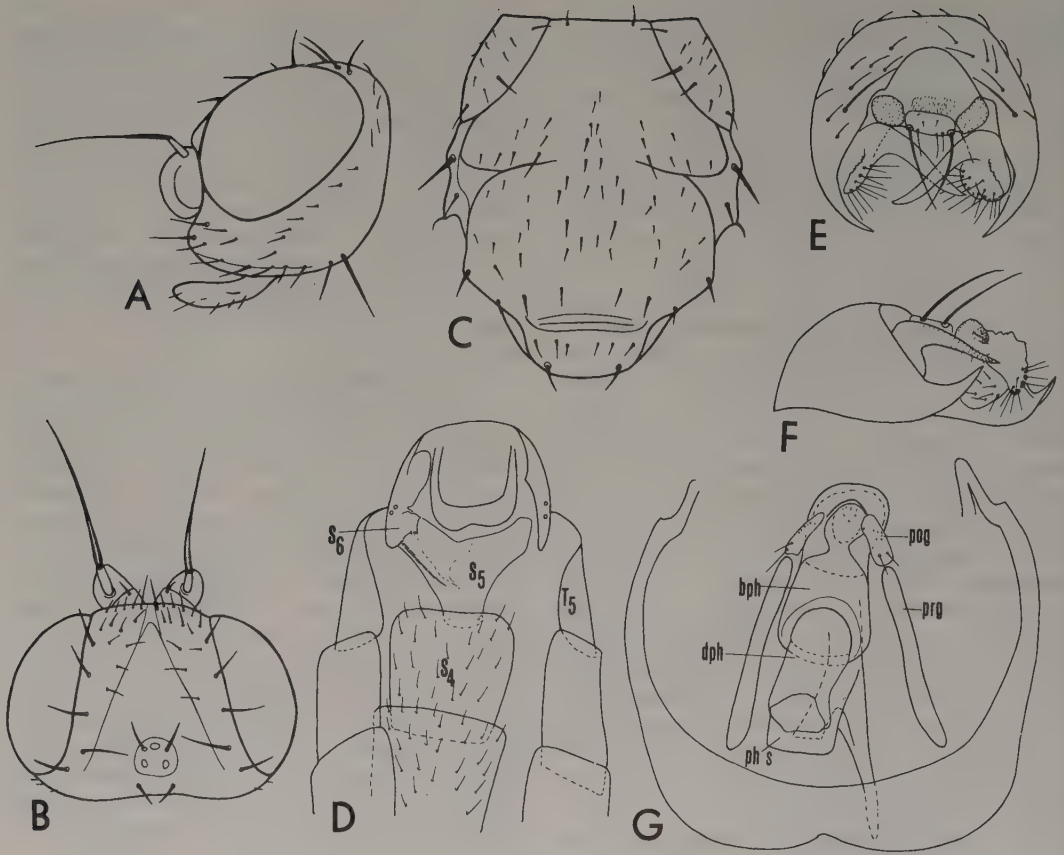


Fig. 25. — A—G. *Siphonellopsis lacteibasis* Strobl. — A. Head, lateral view. — B. Head, dorsal view. — C. Thorax, dorsal view. — D. Apical part (except phallic complex and epandrium) of male abdomen, ventral view. — E. Epandrium, posterior view. — F. Epandrium, oblique lateral view. — G. Phallic complex, ventral view.

an transverse desclerotized area and with two pairs of sensilla trichodea. S_5 in male well developed. S_6 indistinct.

Length 4 mm. Wing length 3 mm.

Genus *Siphonellopsis* Strobl, 1905: 366

Figs 25, 112 B.

Type species: Siphonellopsis lacteibasis Strobl, 1905.

Synonymy: Chaetoscelis Nartshuk, 1963: 675, n. syn., type species: *Chaetoscelis rossica* Nartshuk, 1963.

Medium size, 3 mm, black species with short bristles, very short flat scutellum and brownish, basally whitish wings.

Head higher than long, black except on anterior part of jowls, with relatively short and stout black bristles. Eyes projecting laterally, oval, with oblique long axes, with sparse, very

short hairs. Jowls dusted, about as broad as ant_3 , with one long posterior pst , one row along lower margin and a few bristles behind vi , the anterior upper one distinctly stronger, almost as vi . Postocular ciliation continuing in one row down the postgenal ridge. Vibrissal angle projecting. vi distinct. Cheeks absent. Frons somewhat projecting, longer than broad, narrower in front, velvety black with some fr in front. Frontal triangle large, behind broad as about 2/3 of frons with almost straight side margins reaching almost to front of frons, smooth, shining black. if few, along the margin of the triangle, incurved. oc rather short, procurved, divergent. pvt shorter than oc upright, convergent. vii strong incurved. vte shorter than vii , outcurved. Three strong orb , the posterior out- and procurved, the anterior ones procurved. Face concave. Facial carina, short and narrow, present between antennae. Clyp-

eus black. Proboscis very short. Palpi rather long and broad, yellow. Antennae yellowish, dorsally darkened. ant₂ short. ant₃ rounded squarish higher than long, with very short pubescence. Arista almost naked, basal segments yellowish, flagellum black.

Thorax black with mostly short and stout black hairs and bristles. Humerus large, dusted, with some hairs and 1 short recurved and 1 short incurved *h*. Mesonotum flat, smooth, dusted. 1 *a npl*, rather long. 1 short *p npl*. Other macrochaetae short. 1 *a pa*, 1 very small *p pa*. Indistinct rows of hairs along *dc* and *acr* lines. 1 short presutural *dc*, 1 short posterior *dc*. Distinct *prs* and *sa* absent. Scutellum short, much shorter than broad, flat, smooth, dusted. *ap sc* short, inserted wide apart, 1 small *la sc*. A few short hairs on the disc. Prosteronum naked. Pleura mainly shining, smooth. prpl in lower corner with two upcurved hairs. mpl dusted in upper posterior corner, without hairs. ptpl dusted. stpl without distinct *stpl*, with few hairs, dusted below.

Legs long and stout, especially f₁ and f₃ dilated. Coxae, trochanters, middle and hind feet yellowish, legs otherwise mostly black. Tibial organ absent. t₃ with short apical spur.

Wings brownish, basally whitish, with strong dark veins. Especially mg₂ very broad. mg₁: mg₂: mg₃: mg₄ = 21: 38: 28: 12. t_a distinctly outside tip of r₁ and outside middle of discal cell. Angle between t_p and t_a—t_p 105°. The extension of t_p cuts mg₂. Halteres white.

Abdomen long, oval, black, dusted with black hairs. Sternites relatively broad. Female cerci short. Male S₆ well developed at left side irregular and united with S₇. S₅ well developed, almost symmetrical. Cerci fused, with a pair of long bristles. Middle lobus of surstylus narrow, pointed. Posteroventral corner of epanthrium prolonged. Hypandrial arms not fused behind. Pregonites very long and narrow. Postgonites short, with 2 distinct bristles. Basiphallus large. Distiphallus short membraneous.

Distribution: S and SE Europe, SW and C Asia.

Material studied: *Siphonellopsis lacteibasis* Strobl.

Remarks: From the original description and figures published by Nartshuk 1963, it is obvious that *Chaetoscelis* Nartshuk is identical with *Siphonellopsis* Strobl.

SUBFAMILY OSCINELLINAE BECKER, 1910

Synonymy: Oscininae Fallén, 1820 (as Oscinides, p.p.); Rondani 1856 (as Oscinina) (type genus

Oscinis Latreille, 1804, equals *Chlorops* Meigen, 1803, isogenotypic).
Oscinosominae Enderlein, 1911.
Botanobiinae Malloch, 1913.
Palaeoscinellinae Duda, 1930, p.p.
Hippelatinae Duda, 1930, p.p.
(Heringiinae Enderlein, 1934, belongs to Ep-
hyridae).

The subfamily Oscinellinae is characterized by more or less numerous, recurved *orb*, 1—2 *p npl*, absence of incurved *h*, *stpl*, *prs*, *pra*, and *sa*, and by only 1 *dc*. Femural and tibial organ can be present. Costa, with few exceptions, reaches m₁₊₂ which is well developed. Male abdomen symmetrical. Male cerci reduced, or well developed and free or basally fused but then with free apical ends.

The Oscinellinae genera can be grouped into two groups which I think represent two evolutionary lines and which I think deserve the rank of tribes, viz. Rhodesiellini, which show many plesiomorphous features such as divergent *oc*, hairy eyes, hairy mpl, and Oscinellini with a higher number of apomorphous characters.

Key to tribes

- 1. *oc* procurved and divergent. Male cerci absent. Scutellum more or less triangular and flattened. Scutellars usually arising from distinct warts or long projections. mpl hairy Rhodesiellini n. trib.
- *oc* upright, cruciate or recurved, parallel or convergent. Male cerci usually present. Scutellum rounded and convex or triangular, flattened. Scutellars arising from warts or not. mpl hairy or naked. If *oc* are procurved and divergent then the male cerci are present and the scutellum is rounded and convex without warts. If male cerci are absent then the *oc* are recurved Oscinellini Becker

TRIBUS RHODESIELLINI n. trib.

Type genus: *Rhodesiella* Adams, 1905.

The tribe Rhodesiellini is characterized by a large, shining frontal triangle with numerous long, incurved *if* along or on the margin of the triangle; long, divergent and procurved *oc*. *pvt* are upright, cruciate. *vti* and *vte* are long. The mesonotum has numerous, evenly dispersed hairs and a stellate micro-sculpture. Only 1 *p npl* is present. The scutellum is more or less prolonged and flattened with bristles arising from warts, sometimes very long or numerous. mpl are hairy. Prosteronum some-

times hairy and a tuft of hairs or a few small bristles are present at the anteroventral corner of the prpl. In at least some genera there is a femoral organ composed of a group of short hairs on warts. The wings are broad and of *Rhodesiella*-type with oblique t_p and often strongly curved m_{1+2} . The veins r_1 and r_{2+3} are often short and procurved. In the male genitalia the cerci are reduced and the surstyli simple. The phallus is special with strongly sclerotized selerites or it is long and curved. The gonites are more or less three-lobed with the postgonites apically incurved.

The complex of all these structures makes it defensible to assign a category of higher rank than a genus group for these genera, namely a tribe. The *Rhodesiellini* undoubtedly belongs to *Oscinellinae* but is quite distinct from *Oscinellini*. The plesiomorphous feature, divergent procurved *oc* is present both in *Chloropinae* and *Siphonellopsinae* but not in *Oscinellini* except in the odd genus *Javanoscinis*. On the other hand the apomorphous feature, femoral organ is present also in *Oscinellini*.

Among the genera *Scoliophthalmus* Becker is most apart with naked, oval eyes, straighter m_{1+2} , narrower wings and a special basiphallalic selerite.

Rhodesiella Adams, *Dactylothyrea* de Meijere, *Euthyridium* Frey and *Nomba* Walker seem very close. Especially the wings are similar. At least some *Rhodesiella* have a femoral organ also on f_3 whereas *Dactylothyrea* and *Tachinoceras* lack such an organ even on f_2 . Unfortunately, it has not been possible to study the male genitalia of all the genera but they are easily separated by characters on the antennae, frontal triangle and scutellum.

Key to genera (males)

1. ant_2 more than 2.5 times longer than broad. Prosternum covered with numerous hairs. Fig. 29, A—D *Tachinoceras* de Meijere
- ant_2 short. Prosternum bare 2
2. Eyes oval, horizontal. Basiphallus with black skeleton with sharp, partly serrate spines. Fig. 26 *Scoliophthalmus* Becker
- Eyes more rounded with oblique or vertical long axes. Basiphallus (when known) without such sclerite 3
3. Phallus long, curved, well sclerotized. Gonites with 3 lobes. Apical end of postgonites long and incurved towards mid-line. Frontal triangle smooth, shining. Scutellum rounded, convex or triangular usually with 4 scutellars arising from short or long warts (figs 27, 28) 4

- Male genitalia unknown. Scutellum large, rectangular with 4 warts or oval with numerous warts (figs 29, I, F) 5
- 4. Scutellars arising from small or moderately long warts. Fig. 27. *Rhodesiella* Adams
- Scutellars arising from very long and curved fingerlike projections. Fig. 28 *Dactylothyrea* de Meijere
- 5. Scutellars rectangular with 4 scutellars arising from long, straight warts. Fig. 29, F *Euthyridium* Frey
- Scutellum oval with numerous scutellars arising from warts. Fig. 29, I *Nomba* Walker

Genus *Scoliophthalmus* Becker, 1903: 147

Figs 26, 112 C.

Type species: *Scoliophthalmus trapezoides* Becker, 1903.

Small to medium size, 2—3 mm, shining black species with oval horizontal, naked eyes and very slender naked arista.

Head as high as long, shining black with long hairs and bristles. Eyes narrow, oval, with horizontal long axes, naked. Jowls very broad, almost as broad as eyes, shining, black, with one row of long hairs below and one row of postocular ciliation behind. Vibrissal angle not projecting. The lower margin of face projecting. *vi* long. Cheeks linear. Frons somewhat projecting, longer than broad, shining, with few *fr*. Frontal triangle broad, behind 2/3 as broad as frons with somewhat convex side margins reaching front of frons, smooth, shining, black with numerous long *if* in one row along the margin of the triangle, incurved and procurved. *oc* and vertical bristles long, subequal. *oc* procurved, divergent. *pvt* recurved to upright, cruciate. *vti* incurved. *vte* outcurved. *orb* 8—10, distinct, gradually increasing in length from front to back. Face shining, black, concave. Facial carina low, rather broad, reaching middle of face. Clypeus black, shining. Proboscis of medium size. Palpi short, black. Antennae yellow, more or less darkened. ant_2 short. ant_3 higher than long with produced upper corner, pubescent. Arista long, very slender, almost naked.

Thorax shining, black, with distinct yellowish to black hairs and bristles. Humerus with some hairs and distinct *h*. Mesonotum moderately convex, more or less flattened behind, not quite evenly covered with numerous short hairs arising from small stellate granulae. Hairs not in distinct rows. Thoracal bristles long and slender. 1 *a npl*, 1 *p npl*, 1 *a pa*, indistinct *p pa*,

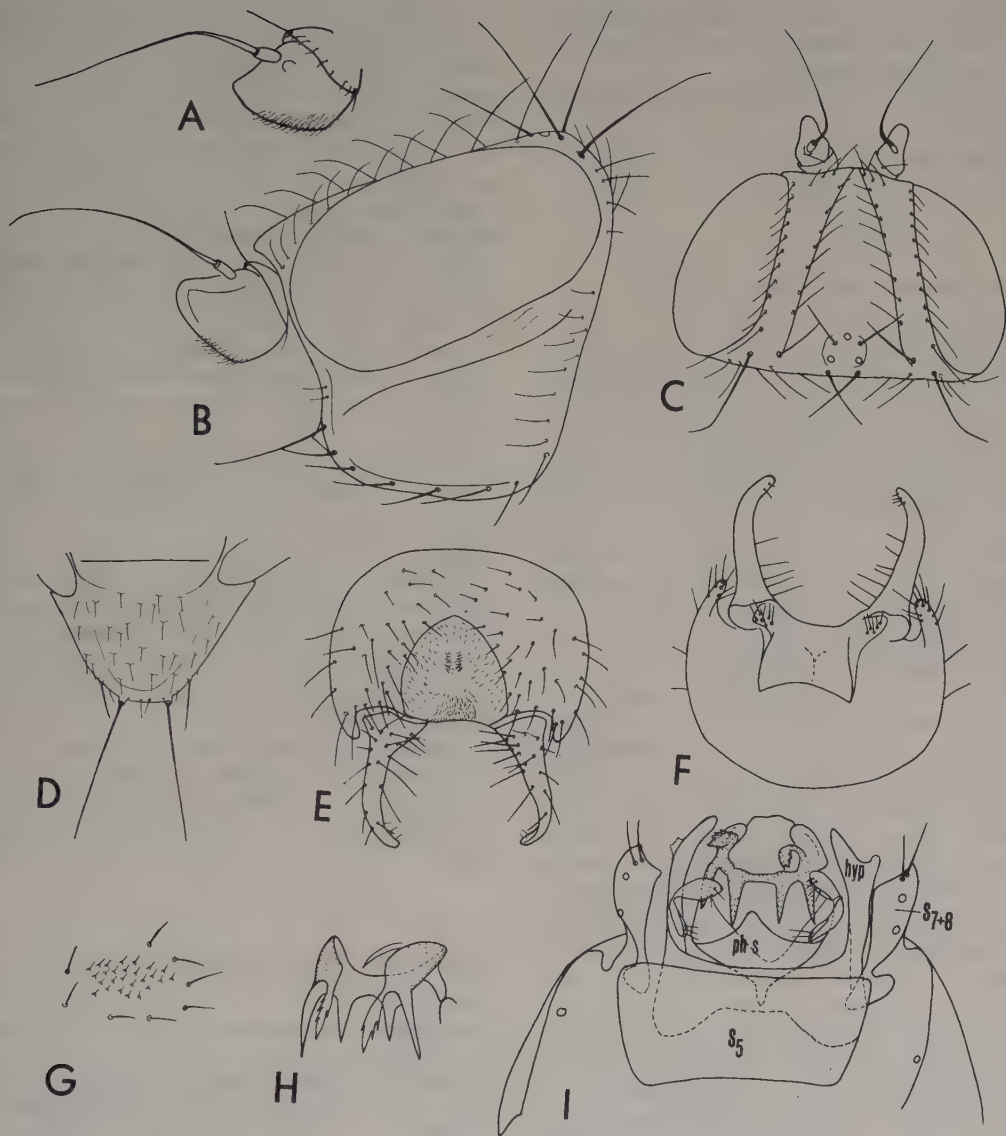


Fig. 26. — A—J. *Scolioiphthalmus trapezoides* Becker. — A. Antenna, outer side. — B. Head, lateral view. — C. Head, dorsal view. — D. Scutellum, dorsal view. — E. Epandrium, posterior view. — F. Epandrium, ventral view. — G. Femoral organ, f_2 . — H. Basiphallallic sclerite. — J. Phallic complex with associated structures, ventral view.

1 *dc*. Scutellum shining, black, relatively long, rounded triangular, somewhat flattened, with numerous hairs arising from stellate granulae. *ap sc* long and slender, arising from distinct warts. 1 pair of short *la sc* arising from small warts. Pleura smooth, shining. *mpl* hairy. *stpl* with few hairs.

Legs short with rather stout femora, black, more or less yellow. Femoral organ formed by

a rounded group of small warts. Tibial organ absent.

Wings with straight r_{2+3} , r_{4+5} and m_{1+2} , moderately broad anterior basal cell and strongly oblique t_p . Halteres black.

Abdomen oval, black, thinly dusted, shining at sides, with some hairs. Female cerci slender. Surstyli long, narrow, hook-like. Distiphallus basally with strongly sclerotized armature with

long sharp projections. Postgonites small, fused with the small pregonites. Phallapodemite sclerite large, bowl-shaped.

Distribution: Africa; Oriental and Australian Regions.

Material studied: *Scoliophthalmus trapezoides* Becker.

Genus *Rhodesiella* Adams, 1905: 197

Figs 27, 112 D.

Type species: *Rhodesiella tarsalis* Adams, 1905.

Synonymy: *Macrostyla* Lioy, 1864: 1126, type species: *Chlorops plumigera* Meigen, 1830 (pre-occupied); *Meroscinis* de Meijere, 1908: 172, type species: *Meroscinis scutellata* de Meijere, 1908; *Aspistyla* Duda, 1933: 224, type species: *Chlorops plumigera* Meigen, 1830.

Small, 1.5–3 mm, black species with large rounded, naked eyes, hairy arista and prolonged, more or less triangular scutellum.

Head black, higher than long, with very long pale or black hairs and bristles. Eyes large rounded oval with vertical long axes, naked. Jowls narrow to linear with one row of hairs. *vi* long and slender. Cheeks not visible. Frons somewhat projecting, longer than broad, silky shining, with few *fr*. Frontal triangle large, behind almost as broad as frons with slightly convex, straight, or slightly concave side margins and with a pointed or more or less broadly rounded apex reaching front of frons, smooth, shining, black or with blue or red-blue metallic lustre. *if* very long, along margin of triangle, incurved and procurved. *oc* very long, procurved, divergent. *pvt* long as *oc* upright, cruciate. *vii* somewhat smaller incurved. *vte* distinctly longer than *pvt* outcurved. 8–10 long, recurved *orb*, the length increasing from front to back. Face narrow, flat or shallowly concave, shining black, with somewhat projecting lower margin. Facial carina indistinct. Clypeus black, dusted or shining. Proboscis short or of medium size. Palpi rather short, cylindrical. Antennae yellow or black. *ant*₂ short. *ant*₃ rounded, higher than long, pubescent. Arista long and slender, dark, with long, rather dense pubescence.

Thorax black, shining, with distinct pale or dark hairs and bristles. Humerus with numerous hairs and distinct *h*. Mesonotum distinctly convex, relatively broad, shining, evenly covered with longer or shorter, yellow or dark hairs arising from small granulae, thus causing rather coarse microsculpture. The hairs are

not in lines or parted. 1 *a npl*, 1–2(?) *p npl*, 1 *a pa*, 1 small *p pa*, 1 *dc*. Scutellum shining black, distinctly prolonged, often much so, usually distinctly triangular and flat above, with numerous hairs above and along margins arising from small granulae. *ap sc* long, divergent arising from distinct or relatively long warts. Usually only 1 distinct *la sc*. Pleura smooth, shining. *mpl* hairy. *stpl* with few hairs.

Legs short, femora sometimes slightly thickened, or *f*₃ with small ventral spines, yellow to black. Tibial organ indistinct or absent. Femoral organ (on *f*₂) formed by a group of small warts with short, thin bristles. A femoral organ may be present also basally on anterior side of *f*₃.

Wings rather short and broad, hairy. *r*₂₊₃ and *r*₄₊₅ distinctly procurved. *m*₁₊₂ often strongly recurved basally. *t*_p more or less oblique. Halteres yellow or black.

Abdomen short, oval, black, thinly dusted with pale or dark hairs. Female cerci slender. Epandrium oval with terminal surstyli. Postgonites apically incurved, hook-like. Pregonites distinct with strong bristles. Distiphallus long, dilated at middle.

Distribution: World-wide; very species-rich in Ethiopian and Oriental Regions.

Material studied: *Rhodesiella tarsalis* Adams; *R. plumigera* (Meigen); *R. scutellata* (de Meijere).

Genus *Dactylothyrea* de Meijere, 1910: 154

Figs 28, 112 E.

Type species: *Dactylothyrea infumata* de Meijere, 1910.

Synonymy: *Elaphaspis* Bezzi, 1912: 82, 84, type species: *Rhinotora leucopsis* Bigot (Sabrosky 1941).

Medium size, 3–4 mm, dark species with long and strongly convex scutellum with four extremely long projections bearing the scutellars.

Head somewhat higher than long with long pale, bristles and hairs. Eyes large, oval, somewhat kidney-shaped, naked, the anterior ommatidia larger, with somewhat oblique long axes. Jowls narrow, narrower than the slender *mt*₁, with one row of hairs below. *vi* long, pale. Cheeks not visible. Frons not projecting, longer than broad, shining, brown, with rather few pale *fr*. Frontal triangle large, behind almost as broad as frons with straight side-margins reaching front of frons, smooth, shining, black, *if* in one row on a narrow edging

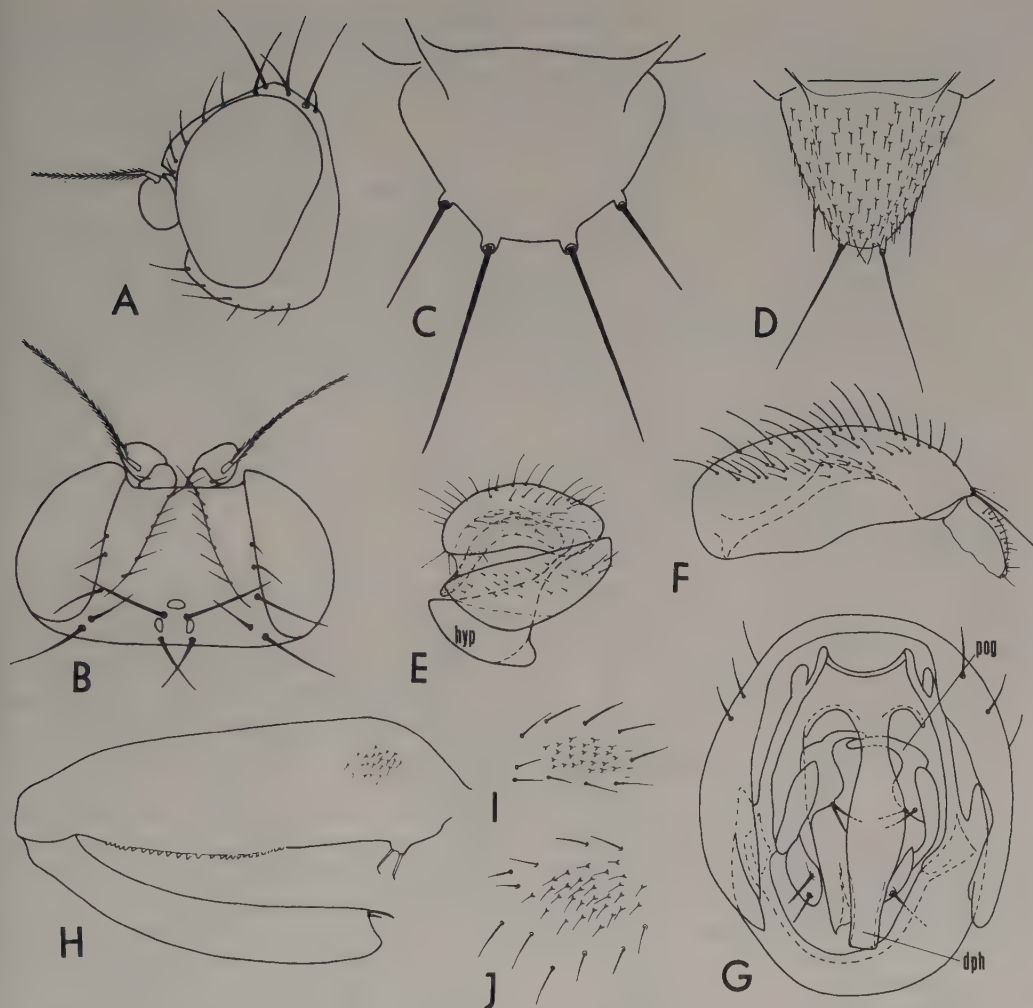


Fig. 27. — A—C. *Rhodesiella plumigera* (Meigen). — A. Head, lateral view. — B. Head, dorsal view. — C. Scutellum, dorsal view, hairs omitted. — D—J. *Rhodesiella scutellata* (de Meijere). — D. Scutellum, dorsal view. E. Male genitalia, lateral view. — F. Epandrium, lateral view. — G. S_{7+8} and phallic complex, ventral view. — H. f_3 and t_3 , anterior view, hairs (except femoral organ) omitted. — I. Femoral organ, f_2 . — J. Femoral organ, f_3 .

along the triangle, long, incurved. *oc* long, procurved, divergent. *pvt* about twice as long as *oc*, upright, cruciate. *vti* long as *oc*, incurved. *vte* long as *pvt*, outcurved. 8—10 distinct, recurved *orb*. Face short and broad, shining black, with indistinct carina. Clypeus broad, black, dusted. Proboscis short. Palpi very short, black. Antennae yellow to white. ant_2 short, with long bristle. ant_3 rounded, about as long as broad, distinctly pubescent. Arista long, slender. Basal segments short slender, flagellum basally pale and naked,

apically dark with sparse but distinct pubescence.

Thorax black, shining, with pale or dark hairs and bristles. Humerus hairy with 1 long *h*. Mesonotum rather convex, shining but with coarse microsculpture due to stellate granulae, from which the numerous, evenly dispersed, short hairs arise. Thoracal bristles long to very long. 1 straight *a npl*, 1 upcurved *p npl*, 1 *a pa*, *p pa* indistinct, 1 *dc*, very long, more than twice as long as *a pa*, about as long as scutellum. Scutellum rounded oval, very thick and

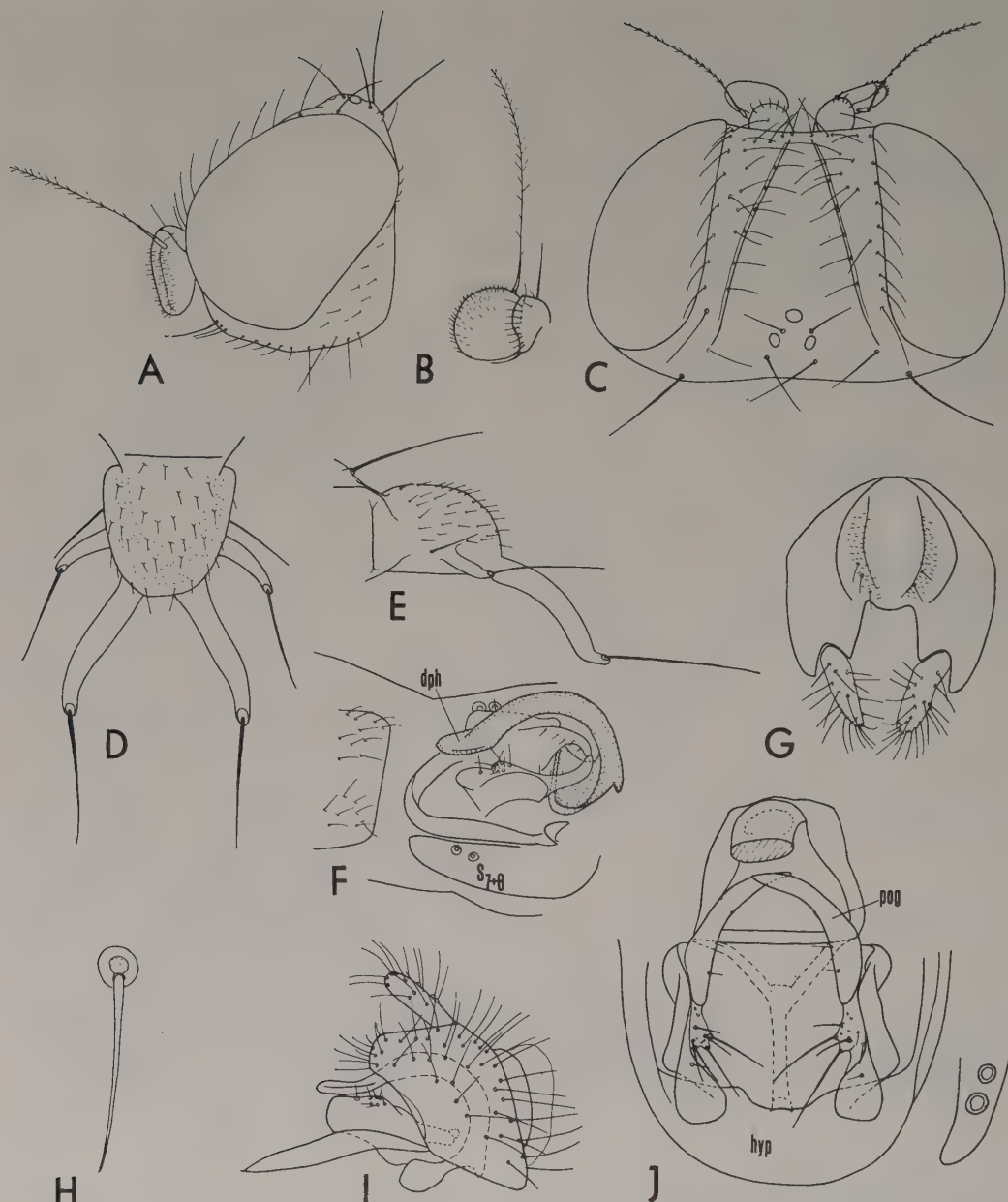


Fig. 28. — A—J. *Dactylothyrea infumata* de Meijere. — A. Head, lateral view. — B. Antenna, outer side. — C. Head, dorsal view. — D. Scutellum, dorsal view. — E. Scutellum, lateral view. — F. Phallic complex, latero-ventral view. — G. Epandrium, posterior view. — H. Hair from t_2 . — I. Male genitalia, lateral view. — J. Phallic complex, distiphallus cut, ventral view.

convex, shining, on disc and sides covered with hairs arising from stellate granulae. *ap sc* long, arising from long curved, projections which are longer than scutellum. Apical pair of *la sc* arising from long, curved projections which are about half as long as those of

the *ap sc*. A second slender *la sc*, not arising from any projection, present. Pleura dark, shining, smooth. *mpl* hairy. *stpl* with few pale hairs.

Legs rather long yellow, partly dark. Fore and middle tarsi very long and slender. t_2

somewhat thickened, with special flat, rounded structure (fig. 28 H) above each macroseta. Tibial organ absent. f_3 somewhat thickened. Femural organ absent.

Wings uncoloured or partly brown with large alula. Halteres yellow.

Abdomen narrow. Male genitalia without distinct cerci. Surstyli simple, cylindrical, hairy with granulae. Distiphallus long and slender, semicircularly bent with broadened, flat apex. Gonites of complicated structure. Postgonite with long, curved posterior cornus, anterior part irregular at middle with a group of very long bristles.

Distribution: Ethiopian and Oriental Regions.

Material studied: *Dactylothyrea infumata* de Meijere.

Genus *Euthyridium* Frey, 1923: 98

Figs 29, 112 F.

Type species: *Euthyridium nobile* Frey, 1923.

Small, 2.5 mm, black species with *Rhodesiella*-like wings and large squarish, flat scutellum with scutellars arising from four long tubercles.

Head higher than long, black with distinct black hairs and bristles. Eyes large oval, naked, with almost vertical long axes. Jowls very narrow, almost linera, with dark hairs. *vi* distinct. Vibrissal angle sharply projecting. Cheeks not visible. Frons hardly projecting, longer than broad, silky shining, without *fr*. Frontal triangle very large, behind almost as broad as frons, with somewhat convex side margins broadly reaching front of frons, shining, black with metallic blue lustre, without microsculpture but with a complex macrosculpture caused by a system of large punctures, grooves and ridges. *if* in one row on the margin of the triangle, incurved, arising from the bottom of large punctures. *oc* shorter than *if*, procurved, divergent. *vii* short, incurved. *pvi* and *vte* lost in the present material but their large sockets indicate that they are very strong. Face flat, sclerotized, black, shining, sloping forwards, without carina. Proboscis short. Palpi short, black. Antennae yellowish. ant_2 small with distinct bristle. ant_3 rounded, oval, longer than broad, distinctly pubescent. Arista slender. Basal segment pale, naked. Flagellum yellowish at base, darkened at tip, with sparse pubescence.

Thorax black, shining. Humerus with numerous hairs and one hair-like *h*. Mesonotum

rather flat, broad as long, evenly covered with numerous short, pale hairs arising from stellate warts and thereby causing coarse microsculpture. Thoracic bristles indistinct, hair-like. Scutellum large, rectangular, longer than broad, long as mesonotum, flat and thin, shining black, with coarse microsculpture, and numerous hairs. *ap sc* and *la sc* strong, black, arising from long cylindrical projections. Pleura shining. *mpl* with hairs. *stpl* with few hairs.

Legs short, rather stout, black, partly yellowish. Tibial organ absent. femural organ unknown.

Wings of *Rhodesiella*-type, with short, procurved r_{2+3} , oblique t_p and last segment of m_{1+2} basally recurved.

Abdomen oval, black, shining, with short, dark hairs. Female cerci short. Male genitalia unknown.

Distribution: Oriental and Australian Regions.

Material studied: *Euthyridium* sp., ♀, from Burma, probably *E. nobile* Frey.

Genus *Tachinoceras* de Meijere, 1924: 45

Fig. 29.

Type species: *Tachinoceras longicornis* de Meijere, 1924.

Medium size, 4–5 mm, species with flattened mesonotum, long slender legs, long scutellum and ant_2 strongly prolonged.

Head longer than high, dark with long, yellow hairs and bristles. Eyes large, with horizontal long axes, larger ommatidia in anterior part, and very few minute hairs. Jowls rather narrow, covered with numerous hairs. Vibrissal angle indistinct. No distinct *vi*. Cheeks distinct, with silvery white pubescence. Frons somewhat projecting, longer than broad, shining in front, dusted behind, with some *fr*. Frontal triangle large, behind at least broad as $3/4$ frons, with somewhat concave side margins and broad tip reaching front of frons, smooth, with an oval depression in anterior part, shining. *if* long, in one row along the margin of the triangle, incurved. *oc* long, divergent. *pvi* about one and a half time as long as *oc*, incurved. *vte* somewhat stronger than *pvi*, outcurved. *orb* 7–9, strong, recurved. Face sloping backwards, short, sclerotized, shining. A short carina present between base of antennae. Clypeus dusted, yellow. Proboscis short. Palpi well developed, rather broad, yellow. ant_1 short,

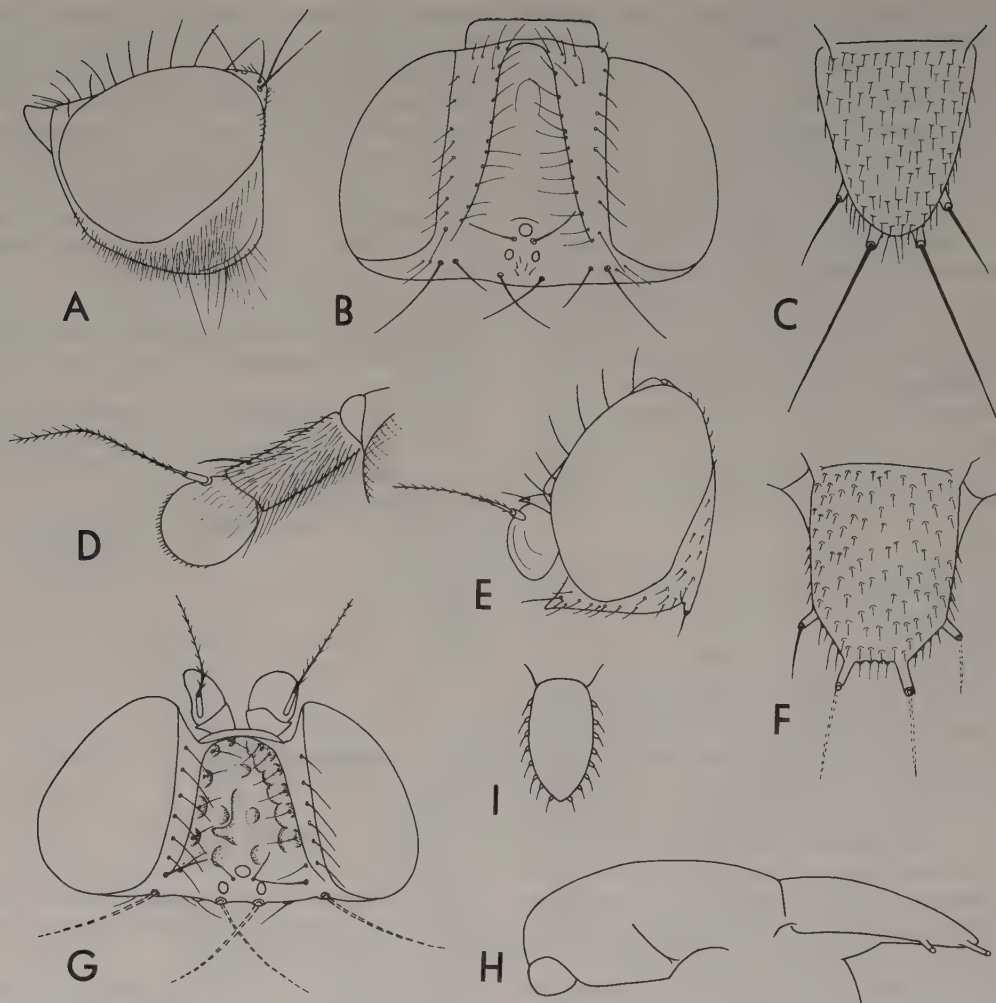


Fig. 29. — A—D. *Tachinoceras longicornis* de Meijere. — A. Head, lateral view. — B. Head, dorsal view. — C. Scutellum, dorsal view. — D. Antenna, outer side. — E—H. *Euthyridium* sp. — E. Head, lateral view. — H. Mesonotum and scutellum, lateral view. — I. *Nomba principalis* (Becker), scutellum, dorsal view, from Becker 1911.

ring-shaped. ant_2 2.5 times as long as broad, strongly hairy, dark, on internal surface partly yellow. ant_3 rather large, thin, round, black, with short pubescence. Arista long and slender, basally pale, black towards end, pubescent.

Thorax black with yellow or white hairs and yellow or dark bristles. Humerus hairy, shining with 1 pale *h*. Mesonotum long, flattened, shining, evenly covered with very numerous yellow hairs arising from stellate granulae, causing coarse microsculpture, the hairs not arranged in lines or distinctly parted. No *a npl*, 1 dark, distinct *p npl*, 1 very long *a pa*, *p pa* indistinct, *dc* small, yellow. Scutellum pro-

longed, triangular, flattened, shining, covered by numerous yellow hairs arising from stellate granulae. *ap sc* strong, about as long as scutellum, arising from distinct warts. 1 *la sc*, shorter, arising from distinct warts. Pleura shining, smooth. *mpl* and *stpl* covered with numerous white hairs. Other pleura naked.

Legs long and slender, yellow. The first metatarsi strongly prolonged, nearly as long as the tibiae. Tibial organ not present. Femural organ not seen, probably not present.

Wings long and broad, of *Rhodesiella*-type with last segment of m_{1+2} basally strongly recurved. Halteres yellow.

Abdomen small, oval, yellowish, thinly dusted with pale and dark hairs.

Distribution: Oriental Region.

Material studied: *Tachinoceras longicornis* de Meijere.

TRIBUS OSCINELLINI BECKER, 1910

The tribus Oscinellini is characterized, at least in its ground-plan condition, by procurved or upright but convergent *oc*, or by recurved and convergent or parallel *oc*, 2 *p npl*, femoral and tibial organ, simple penis with short basiphallus and membranous distiphallus, distinct postgonites and pregonites, postgonites not strongly incurved at apex and by free or only basally fused cerci in males. Some genera of Oscinellini can show some of the character states of Rhodsiellini but not all at one time and never a phallus of the same structure. Examples of exceptions are *Javanscinius* with divergent *oc* but with Oscinellini-type of cerci and some *Dicraeus* without cerci but with recurved *oc*, simple scutellum and well-developed femoral organ.

Key to genera (males)

1. *oc* long, distinctly procurved and divergent. Fig. 30 *Javanscinius* n. gen.
- *oc* short, indistinct, or upright, cruciate, or recurved, parallel, convergent or cruciate .. 2
2. Prothorax neck-like, prolonged with sharp transverse ridges 3
- Prothorax normal, short 4
3. Body with normal, short, curved macrochaetae. Scutellum conical with 4 scutellars below, arising from long warts. Fig. 37 *Sepsidoscinius* Hendel
- At least mesonotum and scutellum covered with long, straight, spinous bristles. Scutellum long, cylindrical without distinct scutellars or warts. Fig. 36 *Myrmecosepsis* Kertész
4. *oc* upright, cruciate 5
- *oc* recurved, parallel, convergent or cruciate 10
5. Mesonotum and/or scutellum covered with long, straight, spinous bristles. Scutellum at least apically cylindrical, without distinct scutellars or warts 6
- Thorax and scutellum with normal, short, curved macrochaetae 7
6. Both mesonotum and scutellum with long, straight bristles. Abdomen dorsally completely covered by syntergum 1+2. Fig. 35 *Anatrichus* Loew
- Only the basally conical, and apically narrow, cylindrical scutellum with long, straight bris-

les. Abdomen dorsally with a least 4 visible, discrete tergal sclerites .. *Togeciphus* Nishijima

7. t_3 with long, curved apical or subapical spur, at least long as width of t_3 . Fig. 34 *Cadrema* Walker
- t_3 without such spur 8
8. Scutellum smooth, rounded, convex. Scutellars not arising from warts. Fig. 31 *Melanochaeta* Bezzi
- Scutellum flattened, short and obtuse or prolonged, triangular with coarse stellate microsculpture 9
9. Scutellars arising from small or moderately long warts. Arista distinctly or strongly thickened. *if* along side of frontal triangle. Fig. 32 *Elachiptera* Macquart
- *ap sc* arising from very long, fingerlike projections. Arista less thickened. *if* in one row on the triangle. Fig. 33 *Disciphus* Becker
10. Head higher than long. ant_3 very large, ovate, hanging down. Frontal triangle short, dusted, with *if* on the surface. Fig. 66 *Pselaphia* Becker
- These characters not present simultaneously. If ant_3 is large it is oblique, reniform, porrect and not hanging 11
11. Arista strongly thickened with dense pubescence. ant_3 oblique, reniform with arista in apical position (figs 39, B; 40, B) 12
- Arista slender and with moderately dense pubescence, not in an apical position. If arista thickened and with dense pubescence then ant_3 not oblique, reniform 13
12. Scutellum rounded, convex. Fig. 39 *Gampsocera* Schiner
- Scutellum triangular, long or very long. Fig. 40 *Pseudogaurax* Malloch
13. Facial carina well developed, complete, more or less broad, reaching epistomal field or it is distinctly triangular in upper part and becoming slender, linear below and disappearing in middle of face 14
- Facial carina nowhere distinct, present at most as a very low, indistinct ridge 36
14. Facial carina complete, reaching epistomal field 15
- Facial carina incomplete, not reaching epistomal field, usually reaching to about middle of face 32
15. Facial carina very broad. Vibrissal angle not projecting. Frons strongly projecting beyond vibrissal angle. Jowls and cheeks broad. Fig. 43 16
- Facial carina relatively narrow, if broad then vibrissal angle projecting. If jowls and cheeks broad then vibrissal angle projecting 17
16. Ground colour black. Figs 43, 44 *Lipara* Meigen
- Ground colour yellow, with some brown or black spots. Figs 43, 44 *Pseudeurina* de Meijere
17. Facial carina very broad, narrowest breadth

- at least 1/3 of the length, forming very deep antennal foveae with narrow openings (fig. 51, B) 18
- Facial carina narrower, breadth at most 1/4 of length. Antennal foveae shallower and with wider openings 19
18. Ground colour yellow, with black stripes and spots. Mesonotum with indistinct grooves. Fig. 51 *Aprometopis* Becker
- Thorax brownish black. Mesonotum with 3 deep, broad grooves (undescribed species of the *Tricimba* complex)
19. Facial carina complete but low. ant₂ prolonged. ant₃ longer than broad, pointed above and at tip with a tuft of longer pubescence. Frontal triangle with numerous *if* arising from large punctures. Fig. 47 *Anomoeoceros* Lamb
- Facial carina higher. ant₂ short or somewhat cup-shaped. ant₃ rounded, at most long as broad. If frontal triangle with numerous *if* then these arising from indistinct punctures 20
20. Proboscis very long. Labella longer than t₁. Head, thorax and abdomen black. Femural organ composed of a group almost undifferentiated bristles. Fig. 46 *Siphonella* Macquart
- Proboscis shorter, if labella long as t₁ then the ground colour of the body is yellow or the femural organ is composed of a group or row of warts with short bristles 21
21. Mesonotum with 3 distinct longitudinal grooves, which are more or less distinctly granulate 22
- Mesonotum without distinct granulate grooves. Shallow depressions or fine linear grooves without granulae may be present 24
22. The whole facial carina is high and distinct. Head with stout spines and sharp carinae behind eyes. Fig. 55, M *Echimba* Duda
- Facial carina in lower half low, narrow, membranous 23
23. Thorax and scutellum normally developed. Wings normal and functioning. Fig. 55 *Tricimba* Lioy
- Thorax very short and broad. Scutellum apically incised. Wings short, not functioning. Fig. 56 *Crassivenula* Sabrosky
24. r₂₊₃ very short, therefore mg₂ distinctly shorter than mg₃. Anterior basal cell short and broad. *if* along margin of frontal triangle. Scutellum rounded, convex 25
25. Bristles, especially *ap sc*, short. Fig. 53 *Siphunculina* Rondani
- Bristles normal, *ap sc* about as long as scutellum .. *Siphunculina* subgen. *Liomicroneurum* Enderlein
26. Femural organ absent. Wings with strongly oblique t_p and broadened anterior basal cell. Head shining, more or less yellowish or white, frons shining. Thorax shining, black 27
- Femural organ present. Wings with less oblique t_p and narrower anterior basal cell. Head shining or dusted. Thorax yellowish or black, dusted or shining 28
27. f₁ not distinctly dilated, without spines below. Fig. 48 *Polyodaspis* Duda
- f₁ dilated with stout, spine-like bristles below (fig. 50, J) *Epimadiza* Becker
28. Frontal triangle very short, distinctly less than half length of frons, with *if* along the margin. Ground colour yellow with black markings. Postgonites partly strongly sclerotized. Fig. 57 *Trachysiphonella* Enderlein
- Frontal triangle at least as long as half length of frons, *if* usually on the triangle. Ground colour black, often covered with thick, grey dust. Postgonites simple 29
29. Body shining black. Rather large species. Frontal triangle shining, with numerous *if* on the surface. Scutellum rounded or prolonged, triangular, with scutellars arising from warts. Fig. 45 *Calamoncosis* Enderlein
- Body largely dusted. Rather small species. Frontal triangle dusted, with *if* in one row along the margin or on the surface 30
30. Male cerci fused basally. Postgonites long. Femural organ absent. r₂₊₃ relatively long. Fig. 52 *Aphanotrigonella* Nartshuk
- Male cerci distinctly separated. Postgonites short. Femural organ present. r₂₊₃ shorter 31
31. Proboscis very long, labella often long as t₁. *if* along the margin of the frontal triangle. Scutellum rounded, convex. Fig. 58 *Oscinimorpha* Lioy
- Proboscis short. *if* on the triangle. Scutellum rounded or apically obtuse, flattened. Figs 52, 54 *Aphanotrigonum* Duda
32. Frontal triangle very small, only present as a narrow shining area in front the anterior ocellus. ant₃ kidney-shaped. Fig. 41 *Cestoplectus* Lamb
- Frontal triangle at least reaching middle of frons. ant₂ rounded 33
33. Thorax shining black. Frons shining, yellowish to black. Femural organ absent. S₅ in male broadened 34
- Thorax black, usually dusted. Frons dusted. Femural organ present or absent. S₅ in male normal 35
34. Cheeks broad. Scutellum large, rounded, flat, with scutellars arising from small warts. Surstyli ovoid. Fig. 49 *Fiebrigella* Duda
- Cheeks not visible in side view. Scutellum normal, rounded, slightly flattened. Scutellars not arising from warts. Surstyli narrow, curved. Fig. 50 *Lasiambia* Enderlein
35. Mesonotum black, thinly dusted or shining. Pleura largely shining. Femural organ present. Postgonites short, rounded. Fig. 59 *Conioscinella* Duda
- Mesonotum and pleura covered with thick

grey dust. Femural organ absent. Postgonites slender. Figs 52, I—K

..... *Aphanotrigonum* p. p. (*meijerei* Duda)

36. r_{2+3} long, recurved. Costa often not reaching m_{1+2} . Male cerci almost absent or present only as narrow projections in a lateral position. Surstyli unusually long, often of a complex shape and with hairs and bristles or shorter with complex structure and stout bristles. Fig. 42 *Dicraeus* Loew s. lat.
— r_{2+3} normal, procurved. Costa always reaching m_{1+2} . Male cerci well developed, not fused basally. Surstyli simple, if of more complex structure then gonites and hypandrium fused 37
37. Surstyli not simple, with various projections and long bristles. Male cerci long, projecting. Postgonites, pregonites and hypandrium fused. Fig. 38 *Gaurax* Loew
— Surstyli simple. Male cerci relatively short and broad. Gonites not fused with hypandrium 38
38. Thorax moderately convex. Scutellum rounded, convex *ap sc* not arising from warts .. 39
— Thorax and scutellum distinctly flattened. *ap sc* arising from small warts 42
39. Frontal triangle shining with *if* on the triangle. Mesonotum shining, with evenly dispersed hairs. Phallapodemic sclerite bowl-shaped. Fig. 62 *Hapleginella* Duda
— *if* along margin of frontal triangle. Phallapodemic sclerite not bowl-shaped 40
40. Frontal triangle dusted. Hairs on mesonotum arranged in lines. Front margin of frons straight or convex. Fig. 60
..... *Tropidoscinis* Enderlein
— Frontal triangle shining 41
41. Front margin of frons concave. Hairs on mesonotum arranged in lines. Body shorter and stouter. Wings shorter and broader. Fig. 61 *Oscinella* Becker
— Front margin of frons straight. Hairs on mesonotum longer, more numerous and evenly dispersed. Body longer and slender. Wings longer and narrower. Postgonites with sclerotized projections. Fig. 63 .. *Lioscinella* Duda
42. Thorax smooth, dusted. Postgonites large, broad, simple. Usually predominantly black species. Fig. 64 *Eribolus* Becker
— Thorax with coarse microsculpture, shining or thinly dusted. Postgonites with a narrower or broader conical, medially directed, strongly sclerotized projection. Less distinctly black species with head and legs largely yellow. Fig. 65 *Oscinisoma* Lioy

The *Javanoscinis* species group

I think the divergent, procurved *oc* and the unique male genitalia are enough to characterize this genus group.

Genus *Javanoscinis* n. gen.

Figs 30, 112 G.

Type species: Meroscinis meijerei Becker, 1911.

Medium sized, 3 mm, species with large, round eyes, divergent *oc* and shining, naked pleura.

Head rounded with dark hairs and bristles. Eyes large, round, hairy, with vertical long axes. Jowls linear with few hairs. *Vi* distinct. Cheeks invisible. Frons somewhat projecting, longer than broad, black, in front shining, behind at sides with thick silvery pubescence, and with few *fr*. Frontal triangle indistinct, behind half as broad as frons, indistinctly reaching front of frons, black, smooth, shining. *if* few, incurved, at the margin of the triangle. *oc* large, divergent, procurved. *pvt* small, convergent. *vii* long, incurved. *vte* long, outcurved. Proboscis short. Palpi black. *ant*₂ short, black. *ant*₃ rounded, flat, yellow, pubescent. Arista basally yellow, flagellum black, pubescent.

Thorax narrow, shining, with dark hairs and bristles. Humerus yellow, hairy, with 1 *h*. 1 long *a npl*, 1 long *p npl*. 1 long *a pa*, 1 short *p pa*, 1 short *dc*. Mesonotum black, smooth, evenly covered with short hairs. Scutellum rounded, convex, black, dusted, with few hairs. *ap sc* long. 1 rather short *la sc*. *prpl* yellow with very sharp carina. Anterior parts of *mpl* and *stpl* yellow. Pleura otherwise brown, smooth, shining, without hairs. Prosternum yellow.

Legs long, slender, yellow. No femural organ. *t*₃ brown with distinct tibial organ.

Wings long, basally narrow, apically broad, in apical third brown. r_{2+3} long. *t*_a inside tip of *r*₁. Halteres yellow.

Abdomen narrow, cylindrical with long, narrow sternites. Male cerci distinct of *Oscinellini*-type. Hypandrium high. Gonites large. Distiphallus, broad rounded.

Distribution: Java.

Material studied: *Javanoscinis meijerei* (Becker, 1911) n. comb.

The *Elachiptera* genus group

The *Elachiptera* genus group is characterized by upright or procurved, convergent or cruciate *oc*, oval, behind somewhat incised eyes and therefore broad postgena, oval or kidney-shaped *ant*₃ and often a thickened arista with long, dense pubescence, specialized structures on the scutellum, femural organ composed by

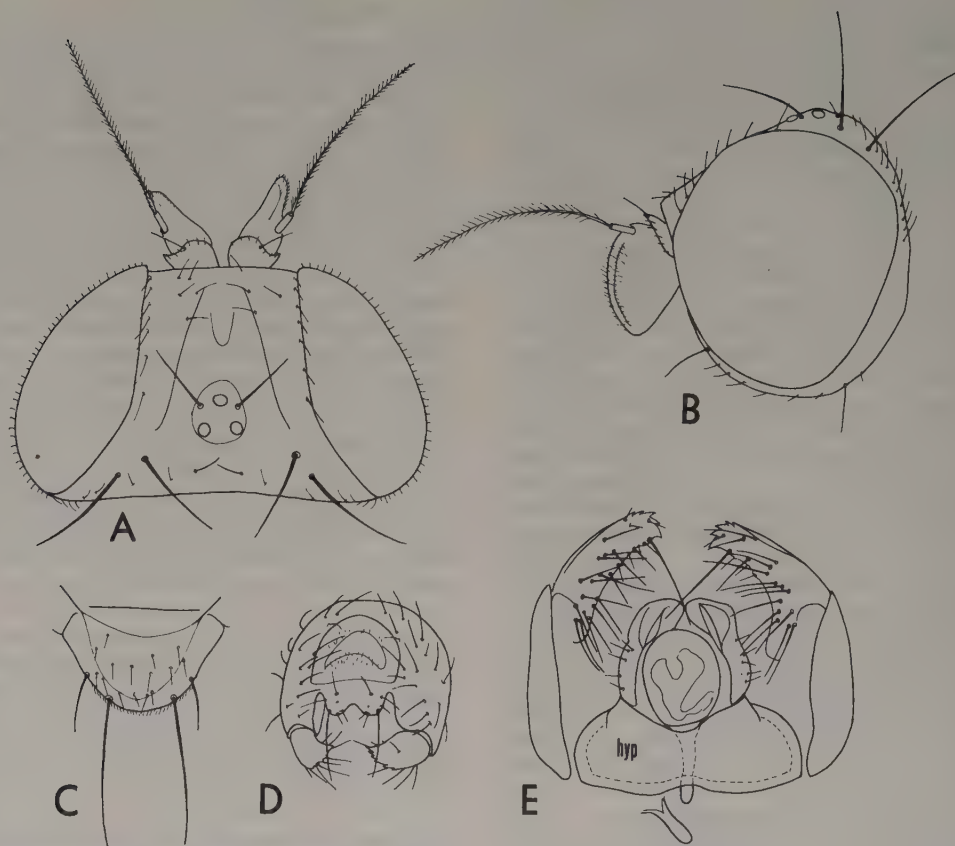


Fig. 30. — A—E. *Javanoscinis mejerei* (Becker). — A. Head, dorsal view. — B. Head, lateral view. — C. Scutellum, dorsal view. — D. Epandrium, posterior view. — E. Male genitalia, ventral view.

a group or by one or two rows of warts with short bristles or short spines and distinct tibial organ. The male genitalia are distinguished particularly by the large, triangular postgonites.

Melanochaeta Bezzi is the least derived genus in the group. It has a smooth mesonotum and a simple, rounded, convex scutellum. ant_3 is oval, the arista moderately thickened but with dense pubescence. 1—2 *orb* are usually stronger than the others.

Elachiptera Macquart is very close to *Melanochaeta* but usually has a much broader arista, coarser microsculpture on mesonotum and scutellum, often granulate grooves along the *dc* lines and a flat more or less prolonged scutellum and scutellars arising from distinct warts. The two genera are often treated as only subgenera of the same genus. Sabrosky (1951) treats also *Cyrtomomyia* Becker, 1913: 160, type species: *Cyrtomomyia pulchra* Bec-

ker, 1913, as a subgenus of *Elachiptera* but stresses its resemblance with *Disciphus*.

The genus *Disciphus* Becker is undoubtedly very close to *Elachiptera* but has slightly different postgonites, if on the surface of the frontal triangle, slender arista with moderately dense pubescence, and *ap sc* on long finger-like projections which are longer than scutellum. I think *Disciphus* is sufficiently distinct to merit the generic status. The oriental species I have seen also have spotted wings and one stronger *orb*. The African species of *Cyrtomomyia* have all *orb* short (Sabrosky 1951).

Hippelates Loew, 1863, has in a very wide sense been applied to numerous forms with a long curved spur on t_3 as the only uniting character. Eventually the situation changed and more and more species were transferred to other genera within Siphonellopsinae and Oscinellinae. Even today the proper genus for

many species with such spur on t_3 is still unsettled. Here only those "*Hippelates*" species usually treated as belonging to *Cadrema* Walker will be treated. Undoubtedly many spurred species, especially from America belong to other genera.

Cadrema Walker has all the characteristics of the *Elachiptera* genus group. The habitus is similar, as are the genitalia. Differences are, except the spur on t_3 , the usually slender, hairy arista, the more uniform *orb*, the stronger *if*, especially a strong pair in front, and the absence of distinct warts on the triangular, flat scutellum.

Anatrichus Loew is characterized by the numerous long straight bristles on mesonotum and scutellum, and the large T_{1+2} that covers the whole abdomen. However the male genitalia are of distinct *Elachiptera*-type with large, triangular postgonites. It resembles *Disciphus* in having slender arista and *if* on the frontal, triangle. All *orb* are sub-equal and short.

Myrmecosepsis Kertész was described from an almost wingless species. It has the structure of T_{1+2} and the scutellum and the long straight bristles on mesonotum and scutellum in common with *Anatrichus*. The structure of the head and prothorax are strongly different. The wingless type species also has long bristles on T_{1+2} . The shortwinged species, described below, lacks these bristles. Although I have not studied the male genitalia I think there is no doubt that it belongs to this genus group. Nartshuk (1964) has discussed the phylogenetic relationships of the *Elachiptera* genus group, including the genus *Togeciphus* Nishijima, 1955 (syn.: *Chaetaspis* Nishijima, 1954), type species: *Chaetaspis kator* Nishijima, 1954).

Sepsidoscinis Hendel I include in the *Elachiptera* genus group. The structure of its head, prothorax and wings are much alike that of *Myrmecosepsis*. The structure of its abdomen and male genitalia are substantially different and unique and the femoral organ is absent. If not included in this genus group it must be placed in one of its own in close connection with the *Elachiptera* genus group.

Genus *Melanochaeta* Bezzi, 1906: 50

Figs 31, 112 H.

Type species: *Oscinis capreola* Curtis, 1829.

Synonymy: *Pachychaeta* Bezzi, 1895: 72, type species: *Oscinis capreola* Curtis, 1829, as *Elachiptera aterrima* Strobl, 1880 (preoccupied); *Pachy-*

chaetina Hendel, 1907: 98, type species: *Oscinis capreola* Curtis, 1829; *Lasiochaeta* Corti, 1909: 147, type species: *Pachychaeta pubescens* Thallhammer, 1898 (Sabrosky 1941).

Small, 1.5—2.5 mm, yellowish to black, *Elachiptera*-like species with smooth convex mesonotum, rounded convex scutellum and scutellars not arising from warts.

Head higher than long with distinct hairs and bristles. Eyes rounded oval with oblique to vertical long axes, sparsely or densely haired. Jowls moderately broad, at least broad as t_1 , dusted, often with silvery white dust, with one row of hairs. *vi* distinct. Cheeks not visible. Frons somewhat projecting, broad as long, dusted, with few *fr*. Frontal triangle of medium size, behind broad as $3/4$ frons with convex side margins reaching $1/2$ — $2/3$ length of frons, smooth, yellow or dark, shining or more or less dusted. *if* in one row along margins of the triangle, incurved. *oc* rather short, upright, cruciate. *pvt* distinctly stronger than *oc*, upright, cruciate. *vti* short as *oc*, incurved. *vte* long as *pvt*, outcurved. *orb* about 6, 1—2 of the middle ones distinctly stronger. Face concave with low carina reaching middle of face. Clypeus yellow or black, dusted. Proboscis short. Palpi cylindrical, yellow or dark. Antennae yellow or more or less darkened. *ant*₂ short. *ant*₃ oval to reniform, higher than long, shortly pubescent. Arista dark, basal segment thickened, pubescent. Flagellum slender or indistinctly thickened with dense pubescence.

Thorax with distinct hairs and slender bristles. Humerus dusted, hairy with distinct *h*. Mesonotum moderately convex, smooth, dusted, evenly covered with short hairs, the hairs indistinctly parted along *acr* and *dc* lines. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 small *p pa*, 1 *dc*. Scutellum rounded, convex, dusted with few hairs above. *ap sc* rather long, about long as scutellum, not arising from warts. 1—2 small *la sc*. Pleura smooth, mostly shining. *mpl* dusted in upper and posterior parts, without hairs. *ptpl* dusted. *stpl* shining with some hairs.

Legs rather long, slender, simple, yellow or darkened. Tibial organ distinct oval. Femoral organ one row of warts with short spines.

Wings of *Elachiptera*-type. Halteres yellow.

Abdomen oval, thinly dusted, subshining, with rather long hairs. Female cerci long and slender. Male genitalia of *Elachiptera*-type.

Distribution: Almost world-wide.

Material studied: *Melanochaeta pubescens* (Thallhammer). *Melanochaeta* spp. (Africa, Sri Lanka).

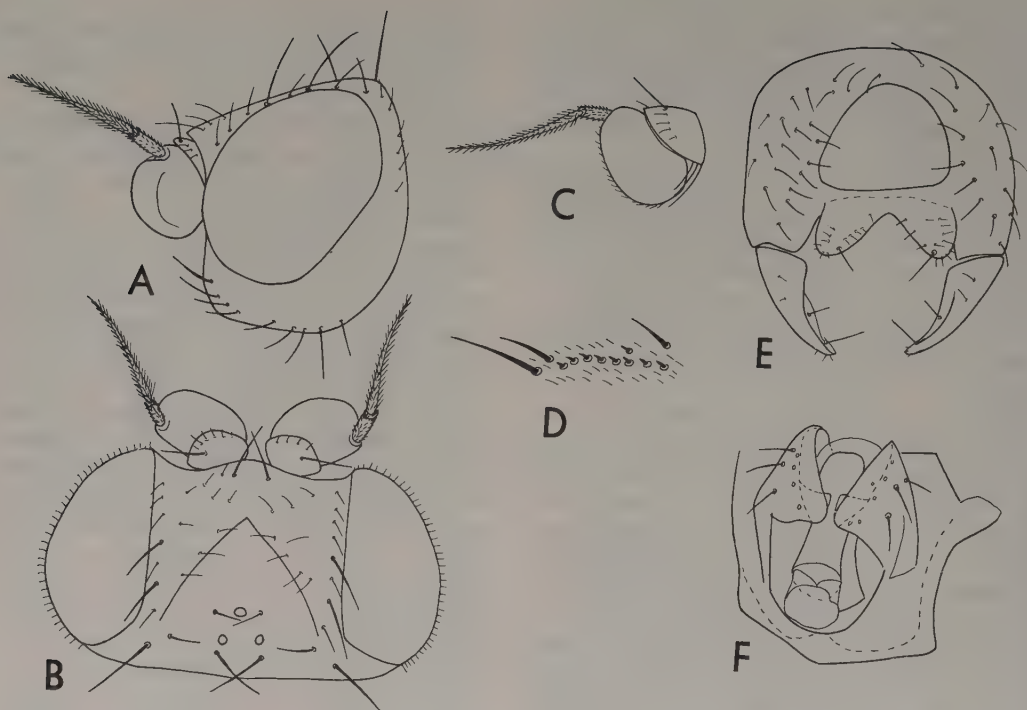


Fig. 31. — A—F. *Melanochaeta pubescens* (Thalhammer). — A. Head, lateral view. — B. Head, dorsal view. — C. Antenna, inner side. — D. Femoral organ. — E. Epandrium, posterior view. — F. Phallic complex, ventral view.

Genus *Elachiptera* Macquart, 1835: 621

Figs 32, 112 I.

Type species: *Chlorops brevipennis* Meigen, 1830.

Synonymy: *Crassiseta* von Roser, 1840: 63, type species: *Oscinis cornuta* Fallén, 1820; *Pachychaeta* Loew, 1845: 50, type species: *Oscinis cornuta* Fallén, 1820; *Macrochetum* Rondani, 1856: 127, type species: *Oscinis cornuta* Fallén, 1820; *Macrochaetum* Corti, 1909: 128, type species: *Oscinis cornuta* Fallén 1820; *Myrmecomorpha* Corti, 1909: 141, type species: *Chlorops brevipennis* Meigen, 1830; *Neolachiptera* Séguy, 1938: 360, type species: *Neolachiptera lerouxi* Séguy, 1938; *Pachychaeta* Loew, 1845: 50 (Sabrosky 1941).

Small to medium size, 2—3.5 mm, yellow to black species with oval or reniform ant_3 , more or less thickened arista and flat scutellum with scutellars arising from small to long, finger-like warts.

Head longer than high or higher than long, with distinct bristles. Eyes oval to rounded oval, with incurved posterior lower margin, horizontal, oblique to almost vertical long axes and sparse, short hairs. Jowls about as broad

as length of ant_3 , dusted, often with silvery white dust, with one to more rows of hairs below. *vi* distinct. Vibrissal angle right. Cheeks not visible. Frons somewhat projecting, as long as broad or broader than long, dusted or subshining with few *fr*. Frontal triangle rather large, behind $2/3$ as broad as frons with slightly convex side-margins reaching from middle to front of frons, yellow to black, smooth, shining. *if* in one row along the margin of the triangle, incurved. *oc* distinct, upright, cruciate. *pvt* usually twice as long as *oc*, upright, cruciate. *vii* smaller, long as *oc* or even shorter, incurved. *vte* about as long as *pvt*, outcurved. *orb* about 6, recurved, 1—2 of the middle ones distinctly longer, more or less upright. Face somewhat sloping with distinct narrow carina reaching middle of face. Clypeus yellow or black, dusted. Proboscis short. Palpi cylindrical yellow or black. ant_2 short with distinct dorsal bristle. ant_3 oval or reniform, yellow to black, with short pubescence. Arista dark, usually distinctly to broadly thickened, with dense rather long pubescence.

Thorax completely yellow, yellow with vari-

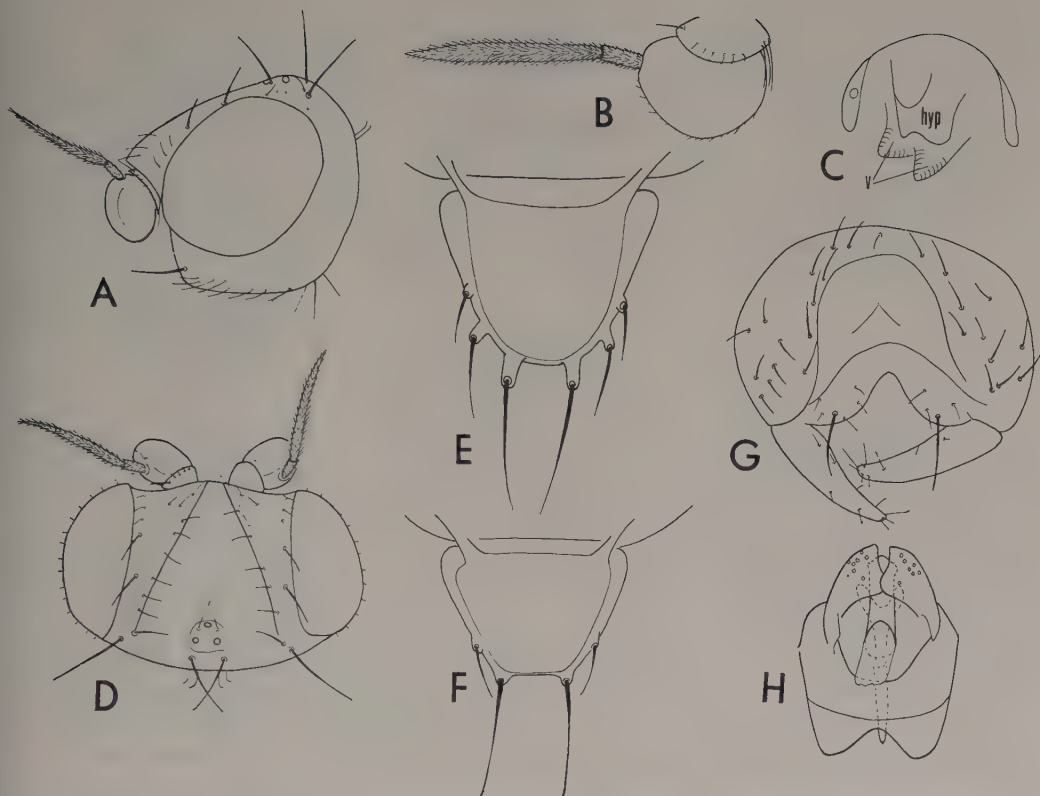


Fig. 32. — A—D, G—H. *Elachiptera brevipennis* (Meigen). — A. Head, lateral view. — B. Antenna, inner side. — C. Male abdominal vesica (v). — D. Head, dorsal view. — E. Epandrium, posterior view. — H. Phallic complex. — E. *Elachiptera tuberculifera* (Corti), scutellum, dorsal view. — F. *Elachiptera scrobiculata* (Strobl), scutellum, dorsal view.

ous dark markings, or completely dark brown or blackish, shining or more or less dusted, with distinct dark or pale hairs and bristles. Humerus with or without spot, shining or dusted, with numerous hairs and usually 1 distinct *h*. Mesonotum usually distinctly flattened, shining, partly or completely dusted, when partly dusted the dust is present along *acr* and *dc* lines and anterior of scutellum, with rather coarse, stellate microsculpture and often distinct narrow grooves along *acr* and *dc* lines, covered with pale or dark hairs, sometimes evenly dispersed, sometimes arranged in distinct lines and parted along *acr* and *dc* lines. Thoracic bristles distinct, slender 1 *a npl*, 1—2 *p npl*, 1 *a pa*, 1 small *p pa*, 1 *dc*. Scutellum squarish or triangular, flat, dusted or shining, with coarse microsculpture and covered with short hairs. *ap sc* and 1-more *la sc* arising from warts, either small or more or less prolonged, finger-like. Pleura smooth, mainly shining. *mpl*

shining or dusted in posterior part, without hairs. *stpl* shining with few hairs.

Legs relatively long, femora often somewhat thickened, yellow or dark. Tibial organ short, oval. Femural organ formed by a rounded group or by two rows of warts.

Wings usually long and broad, sometimes reduced, of Oscinellinae-type. *t_a* outside of tip of *r₁*. Halteres yellow.

Abdomen long, oval, usually of normal build, yellow to dark, dusted, subshining, with short hairs. In some species the basal 2—3 tergites are heavily sclerotized and more or less fused (Nartshuk 1964). Female cerci long and slender. Male genitalia with separate cerci, simple surstyli and broad, triangular postgonites.

Distribution: All regions, except the Australian.

Material studied: *Elachiptera brevipennis* (Meigen); *E. cornuta* (Fallén); *E. scrobiculata* (Strobl, 1900); *E. insignis* (Thomson, 1869);

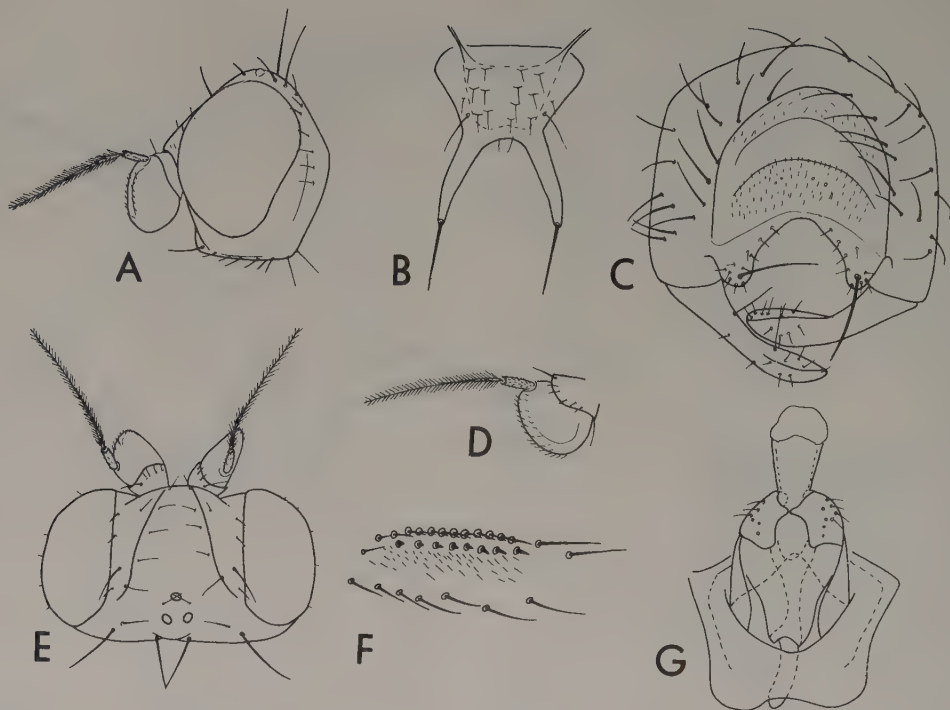


Fig. 33. — A—G. *Disciphus alatus* Becker. — A. Head, lateral view. — B. Scutellum, dorsal view. — C. Epandrium, posterior view. — D. Antenna, inner side. — E. Head, dorsal view. — F. Femoral organ. — G. Phallic complex, ventral view.

E. tuberculifera (Corti, 1909); *E. diastema* Collin, 1946.

Genus *Disciphus* Becker, 1911: 98

Figs 33, 112 J.

Type species: *Disciphus peregrinus* Becker, 1911.

Small to medium size, 2—3 mm, dark brown, partly yellowish, *Elachiptera*-like species with *ap sc* on long cylindrical process.

Head higher than long, yellowish, with dark markings. Eyes oval, kidney-shaped with oblique to almost vertical long axes and sparse short hairs. Jowls narrow, about as broad as *t*₁, with one or two rows of hairs below. *vi* short and distinct. Cheeks not visible. Frons slightly projecting, broader than long, dusted, with few *fr*. Frontal triangle large, behind almost as broad as frons, with somewhat convex side-margins reaching front of frons, smooth, shining, brown. *if* few, in one row on the surface of the triangle, incurved. *oc* short, procurved, convergent. *pvt* very long, upright, convergent. *vte* about half as long as *pvt*, incurved. *vte*

about as long as *pvt*, outcurved. About 6 recurved *orb*, one of the posterior distinctly stronger. Face flat, without distinct carina. Clypeus pale, shining. Proboscis short. Palpi cylindrical, yellow. Antennae yellowish. *ant*₂ short, with distinct bristle. *ant*₃ oval, distinctly higher than long, distinctly pubescent. Basal segments of arista yellowish with short pubescence. Flagellum slender, dark, with distinct pubescence.

Thorax dark brown with dark or pale bristles. Humerus distinctly delimited, dusted or shining, hairy, without distinct *h*. Mesonotum flattened, with rather coarse microsculpture due to stellate granulae at base of the sparse not quite evenly dispersed, short hairs, dusted or partly shining, with distinct mesonotal suture. Thoracal bristles long, subequal. 1 *anpl*, 1 *p npl*, 1 *a pa*, no *p pa*, 1 *dc*. Scutellum squarish, flattened, dusted, with sparse hairs and coarse microsculpture, and terminating in two long horn-like projections each with a distinct *ap sc*. 1 longer and 1 smaller *la sc*. Pleura shining, smooth, *mpl* and *ptpl* partly dusted. *mpl* without hairs. *stpl* shining, with few hairs.

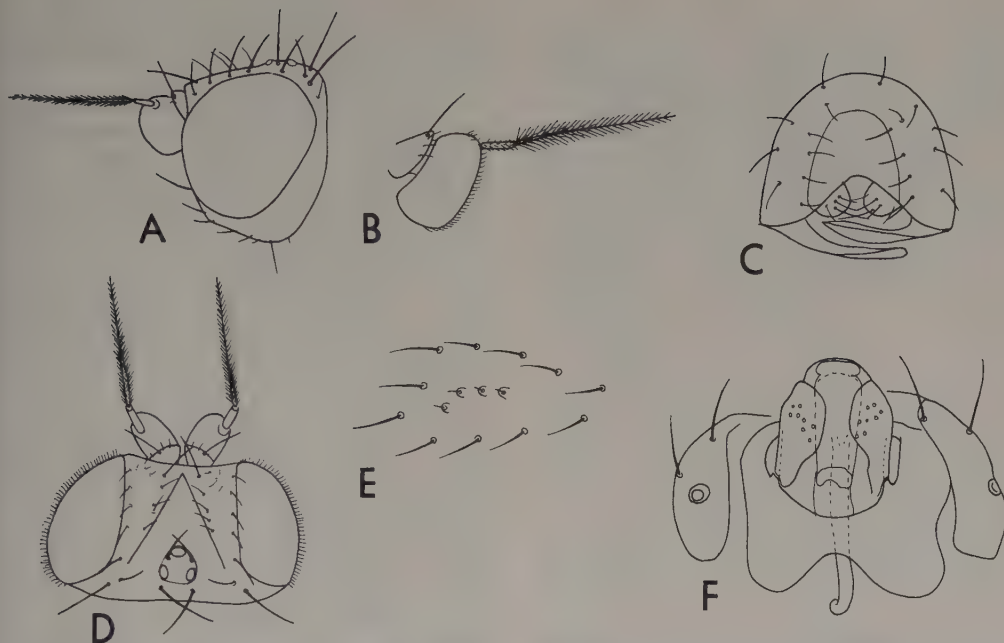


Fig. 34. — A—F. *Cadrema ocellata* (Lamb). — A. Head, lateral view. — B. Antenna, inner side. — C. Epandrium, posterior view. — D. Head, dorsal view. — E. Femural organ. — F. Phallic complex and S_{7+8} , ventral view.

Legs long and slender, pale, partly darkened. Tibial organ oval, distinct, but short. Femural organ consist of about 10 warts with rather long and slender bristles in one row and about 8 warts with short and stout spines in one row, and an area of short microchaetae at one side.

Wings large, long and broad, parallel-sided, with distinctly brown longitudinal or transverse bands. Halteres yellow.

Abdomen long and narrow, brown, dusted, with dark hairs. Male cerci wide apart. Surstyli simple. Postgonites short, with medially-directed point. Pregonites large, fused on the posterior side of the phallic complex. Phallus short.

Distribution: Ethiopian and Oriental Regions.

Material studied: *Disciphys peregrinus* Becker; *D. alatus* Becker, 1911.

Genus *Cadrema* Walker, 1860: 117

Figs 34, 113 A.

Type species: *Cadrema lonchopteroides* Walker, 1860.

Synonymy: *Prohippelates* Malloch, 1913, type species: *Hippelates pallidus* Loew, 1965 (Sabrosky 1941).

Small to medium size, 1.5—3 mm, yellow to black species, with distinct, usually long, apical or subapical spur on t_3 .

Head higher than long, yellow or more or less blackish with long yellow to dark hairs and bristles. Eyes large, rounded, with vertical or somewhat oblique long axes, hairy. Jowls narrow, usually narrower than t_1 , dusted with one row of hairs below. Vibrissal angle not projecting. *vi* well developed. Cheeks not visible in side view. Frons somewhat projecting, usually somewhat longer than broad, dusted, with few *fr*. Frontal triangle behind $2/3$ as broad as frons with straight or somewhat convex side margins reaching from middle to front of frons, smooth, shining, yellow to blackish. *if* in one row, outside the triangle, procurved, and incurved. The most posterior *if* smaller and situated rather close to the margin of the triangle, the anterior *if* gradually growing stronger and situated more and more distant from the triangle. The most anterior *if* often distinctly stronger than the others. *oc* of moderate size, upright, cruciate. *pvt* stronger than *oc*, usually twice as long, upright, cruciate. *vti* slightly stronger than *oc*, incurved. *vte* strong as *pvt*, outcurved. 4—5 long, sometimes very long, recurved *orb*. Face concave,

rather narrow. Facial carina short and low, at most reaching middle of face. Clypeus yellow or black, shining. Proboscis short. Palpi cylindrical, yellow or black. Antennae yellow, often more or less blackish. ant_2 short, with long bristle. ant_3 rounded oval to kidney-shaped, distinctly (often twice) higher than long. Arista black, apically slender, basally more or less thickened, with long pubescence.

Thorax yellow, often with more or less distinct reddish to black spots, or more or less completely black, shining, with yellowish to dark hairs and bristles. Humerus with numerous hairs, and 1 long *h*. Mesonotum rather flat covered by numerous often rather long hairs. The hairs along *acr* and *dc* lines usually parted. Hairs arising from more or less distinct granulae causing distinct microsculpture. Thoracal bristles long and slender. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 smaller *p pa*, 1 long *dc*. Scutellum rounded triangular, flattened, shining, with numerous hairs on the disc. *ap sc* long, often longer than scutellum. 1 distinct *la sc*. Pleura smooth, shining, with or without spots. *mpl* naked. *stpl* with few short hairs.

Legs long. Femora sometimes slightly thickened. t_2 sometimes with long, slightly curved spur. t_3 with stout, often very long, apical or subapical spur. Tibial organ present, smaller or larger. Femoral organ consist of a few warts in one row.

Wings rather long and broad, of Oscinelinae-type. t_p oblique. Halteres yellow.

Abdomen short, narrow, in dry specimens incurved, thinly dusted, with pale or dark hairs. Female cerci long. Epandrium simple with discrete cerci and ventral epandrial sclerite. Surstyli long, narrow and thin. Postgonites large. Pregonites indistinct. Hypandrium large, ring-shaped.

Distribution: Oriental and Ethiopian Regions; America.

Material studied: *Cadrema ocellata* (Lamb, 1918).

Genus *Anatrichus* Loew, 1860: 97

Figs 35, 113 B.

Type species: *Anatrichus erinaceus* Loew, 1860.

Synonymy: *Echinia* Paramonov, 1961: 97, type species: *Echinia bisegmentata* Paramonov, 1961 (Sabrosky 1962, 1964).

Medium size, 2.5–4 mm, brown to black species with mesonotum and the long and narrow scutellum thickly covered with long straight

spines, and abdomen covered by a flat, pear-shaped shield, formed by the fused tergites 1–2.

Head higher than long, dark brown to blackish, with pale brownish, well developed hairs and bristles. Eyes oval or slightly kidney-shaped, with oblique long axes and numerous hairs. *vi* distinct, dark. Cheeks not visible. Frons not projecting, longer than broad, shining, with few *fr*. Frontal triangle large, behind almost as broad as frons, with convex side margins reaching front of frons, dark, smooth, shining. *if* rather long, in one row on the margin of the triangle, incurved and recurved. *oc* shorter than *if*, procurved, cruciate. *pvt* short, somewhat stronger than *oc*, procurved, sub-parallel. *vti* indistinct, incurved. *vte* distinctly stronger than the other vertical bristles, upright and outcurved. *orb* short, about 8–10, recurved. Face almost straight or somewhat concave with narrow and low carina. Clypeus black, shining. Proboscis of medium size. Palpi cylindrical, yellow. Antennae yellowish, darkened at tip. ant_2 short. ant_3 rectangular oval, broader than long, pubescent. Arista long, slender, dark, pubescent.

Thorax dark brown to black with more or less brownish hairs and bristles. Humerus shining, with pale, rather long, slender hairs, without distinct *h*. Mesonotum moderately convex, dusted along *acr* and *dc* lines, around *npl*, and anterior of scutellum, otherwise smooth, shining, unevenly covered by long straight spines. The spines are more numerous along *acr* and *dc* lines and anterior of the mesonotal suture. Thoracal bristles not different from these spines. Scutellum long, narrow, cylindrical, dusted, with numerous long straight spines on the dorsal and lateral surfaces. *ap sc* and *la sc* not different from the spines. Pleura smooth, shining. *mpl* without hairs. *stpl* with few pale hairs.

Legs rather long, slender, simple. Short tibial organ present. Femoral organ with 2–3 indistinct rows of warts.

Wings of *Elachiptera*-type, long and broad. Halteres yellow.

Abdomen covered by a heavily sclerotized, shining, pear-shaped shield formed by the fused T_{1+2} . A distinct groove present on the boarder between T_1 and T_2 . T_1 with coarse striate microsculpture and T_2 with rugose microsculpture and numerous hairs, especially along the margins. The lateral parts of these fused tergites are not infolded ventrally as is normally the case. The remaining abdominal segments and

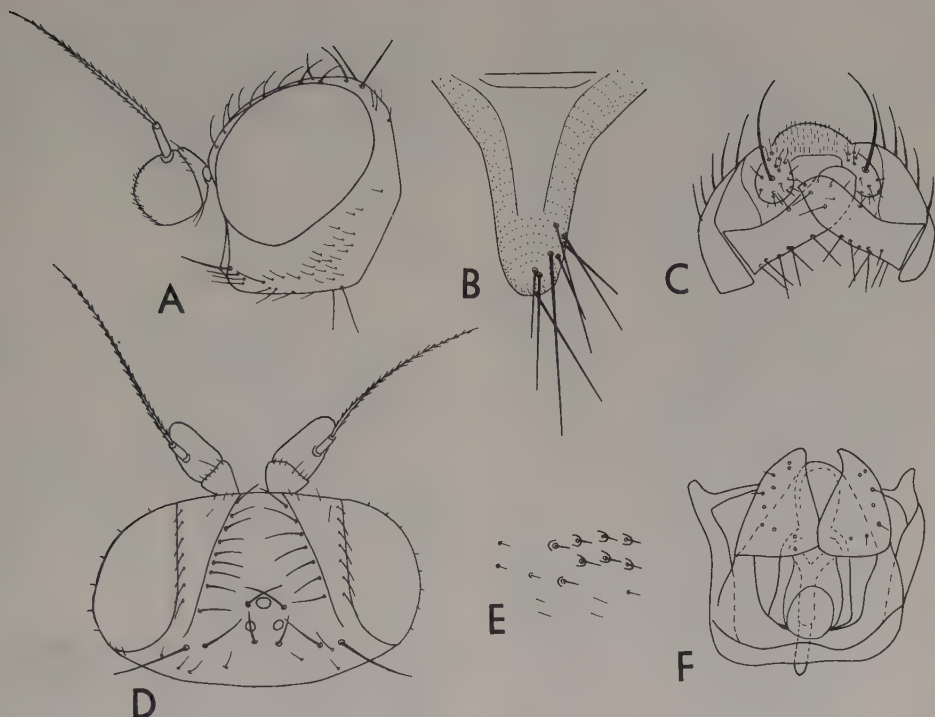


Fig. 35. — A—F. *Anatrachus erinaceus* Loew. — A. Head, lateral view. — B. Scutellum, bristles only partly figured. — C. Epandrium, postero-ventral view. — D. Head, dorsal view. — E. Femural organ. — F. Phallic complex, ventral view.

the genitalia are covered by the large shield. Female cerci long. Male genitalia similar to those of *Elachiptera*, with large postgonites and pregonites fused with the hypandrium which is closed behind. Phallus rather long.

Distribution: Ethiopian and Oriental Regions.

Material studied: *Anatrachus erinaceus* Loew.

Genus *Myrmecosepsis* Kertész, 1914: 244

Fig. 36.

Type species: *Myrmecosepsis hystrix* Kertész, 1914.

Small, 2—3 mm, species with thorax and scutellum covered by long, straight, spine-like bristles as in *Anatrachus* Loew.

Head brown, longer than high, behind eyes greatly swollen, mostly with short, indistinct dark hairs and bristles. Eyes oval with horizontal to oblique long axes, naked, anterior ommatidia larger. Jowls not as broad as ant_3 , dusted, with some indistinct, short hairs. vi distinct. Cheeks not visible. Frons slightly projecting, longer than broad, subshining, with

few *fr*. Frontal triangle large, behind almost as broad as frons with almost straight side margins reaching front of frons, brown, smooth, shining. *if* in one row along margins of triangle, incurved. Ocellar tubercle small and flat. Ocelli very small, *oc* very minute, procurved, convergent. Vertical bristles indistinct, small, hair-like. At broadest part of frontal triangle, opposite ocelli, one strong, more or less distinctly procurved or procurved and outcurved bristle, of uncertain identity, probably representing *vti* or *vte*. 5—6 short, recurved *orb*. Face concave, short and broad, without distinct carina. Clypeus narrow, brownish, dusted. Proboscis short. Palpi cylindrical, brown. Antennae brownish, more or less darkened. ant_2 short, with slender bristle. ant_3 rounded, higher than long, with short pubescence. Arista very long and extremely slender, dark, with extremely short pubescence.

Thorax brown to yellowish without spots. Prothorax neck-like prolonged, with more or less distinct, lateral, transverse carinae. Humerus distinct, dusted, hairy, without *h*. Mesonotum smooth, mostly dusted, with numerous

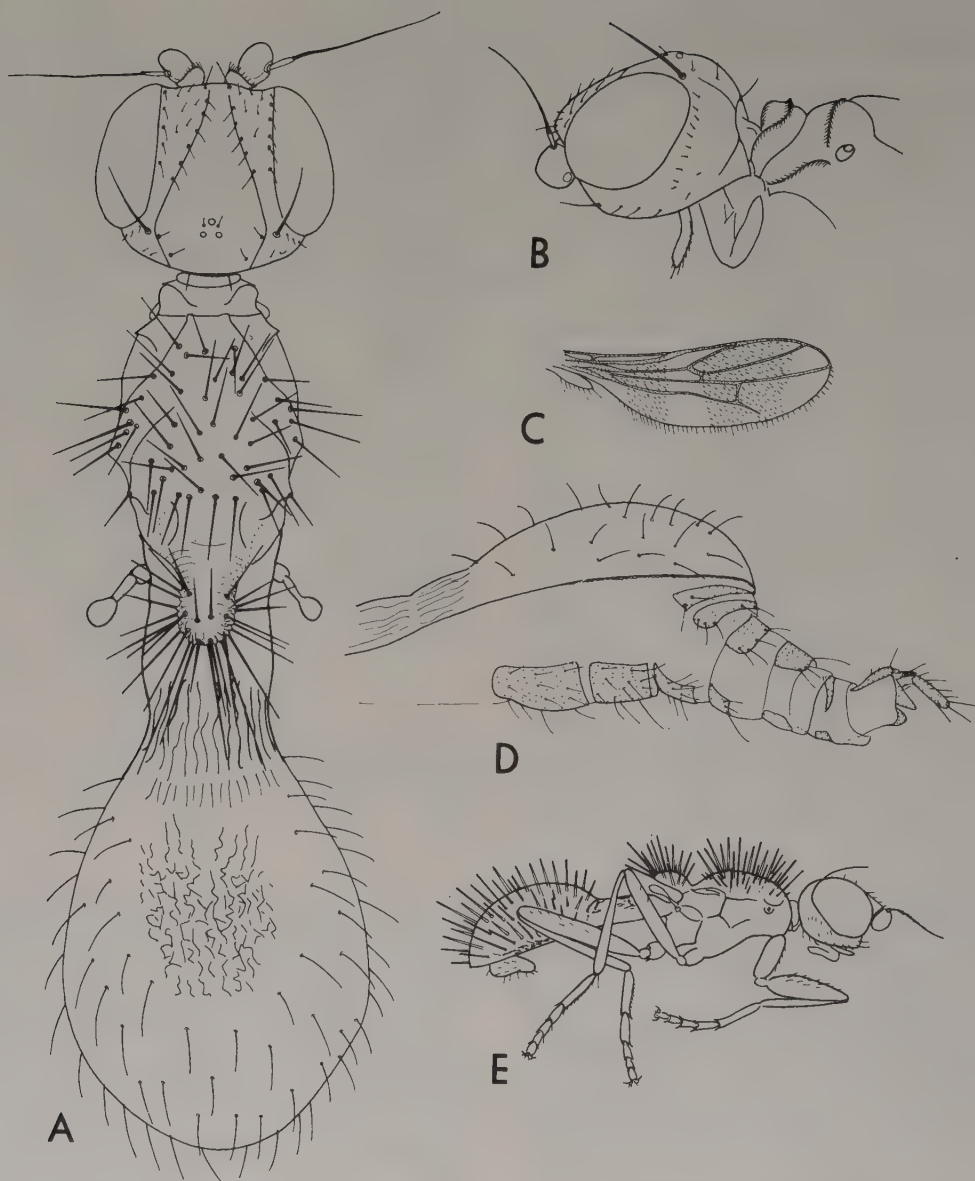


Fig. 36. — A—D. *Myrmecosepsis taprobane* n. sp. — A. Head, thorax, abdomen, dorsal view. — B. Head and prothorax, lateral view. — C. Wing. — D. Female abdomen ventro-lateral view. — *Myrmecosepsis hystrix* Kertész, lateral view, from Kertész, 1914.

long, straight, spine-like, pale bristles with black tips. The usual thoracic bristles indistinguishable from the spine-like bristles. Scutellum long and narrow, more or less cylindrical, dusted, along sides and at tip with some spine-like bristles as on thorax. Pleura smooth, shining. mpl without hairs. stpl with few hairs.

Legs long and slender, simple. Tibial organ short, oval. Femural organ unknown.

Wings reduced, scale-like, or short, not quite reaching the tip of abdomen, with two broad transverse bands. r_{2+3} short. r_{4+5} procurved.

Abdomen built as in *Anatrichus* with tergites 1—2 fused and covering the rest of abdomen. Syntergite 1—2 basally with longitudinal, striate microsculpture, on the posterior parts with the same long spines as on thorax (in *hystrix* Kert.) or naked with irregularly reticu-

late microsculpture medially and at sides smooth, shining, with long soft hairs (in *taprobane* n. sp.). Female cerci long and slender.

Distribution: Oriental Region.

Material studied: *Myrmecosepsis taprobane* n. sp.

Myrmecosepsis taprobane n. sp.

Fig. 36, A—D.

Type locality: Sri Lanka, North Western Province, Swamp 10 miles E of Puttalam.

Holotype: Female: Ceylon (Sri Lanka), N.W. Province, Swamp 10 miles E of Puttalam, 2.II.62. Loc. 45. Leg. Lund University Ceylon Expedition 1962, Brinck—Andersson—Cederholm.

Paratype: 1 female: Ceylon, N.W. Province, Swamp 5 miles NNE of Puttalam, 1.II.62. Loc. 42. Leg. Lund University Ceylon Expedition 1962, Brinck—Andersson—Cederholm.

Types in the Entomological Museum, Zoological Institute, University, Lund.

Diagnosis: The new species closely resembles *Myrmecosepsis hystrix* Kertész but differs in the structure of the wings and the syntergum 1+2. *M. taprobane* n. sp. has short wings with distinct veins. The wings reach as far back as the hairless area of the syntergum. *hystrix* has only very small, scale-like wing rudiments without distinct veins. The posterior broader part of the syntergum in *taprobane* n. sp. has a central, naked area with a coarse, irregularly reticulate sculpture. Around this area the syntergum is smooth and shining with rather long, slender, slightly curved macrochaetae of normal type. In *hystrix* the whole of the broader part of the syntergum is covered by the same strong, straight, bristles as are present on the thorax (fig. 36 E).

Description: The above description of the genus *Myrmecosepsis* is based on the new species *taprobane*, except for those details of wings and abdomen that expressly refer to *hystrix*. Further information of the new species is given in fig. 36 A—D. The colour of the body is pale brown or ochraceous brown, the legs are partly paler, especially the coxae and the basal segments of the hind tarsi are pale yellowish. Body length: 2.7 mm. Wing length: 1.3 mm.

Ecology: Both specimens were swept in dense vegetation in marshy places flooded by a river.

Genus *Sepsidoscinis* Hendel, 1914: 24

Figs 37, 113 C.

Type species: *Sepsidoscinis maculipennis* Hendel, 1914.

Small, 2.5 mm, slender species with flat head, prolonged prothorax and clavate abdomen.

Head longer than high, brown or yellowish, with posterior part swollen. Eyes oval with horizontal to oblique long axes, with sparse short hairs and anterior ommatidia larger than the posterior. Jowls very narrow, narrower than t_1 with one row of hairs. *vi* distinct. Cheeks not visible. Frons not projecting, longer than broad, subshining with few *fr*. Frontal triangle large, behind almost as broad as frons, with slightly convex side margins reaching almost to front of frons, shining, smooth. *if* in a row along the margin, incurved. *oc* small, shorter than *if*, procurved, convergent. *pvt* somewhat stronger, upright, cruciate. *vii* a little stronger than *pvt*, procurved. *vte* still stronger, outcurved. Face short and narrow without distinct carina. Clypeus pale. Proboscis of medium size. Palpi cylindrical, yellow. Antennae brownish. ant_2 small. ant_3 squarish rounded, higher than long with short pubescence. Arista long, slender with short pubescence.

Thorax shining brown without spots. Prothorax prolonged, neck-like with lateral transverse ridges. Humerus indistinct. *h* indistinct. Mesonotum rather convex, smooth, shining, evenly covered with pale hairs. Thoracal bristles relatively short, pale. 1 *a npl*, 1 *p npl*, *a pa* and *p pa* indistinct, 1 *dc*. Scutellum dusted, with a few hairs, rounded, flat above, thick, conical, below with four cylindrical warts bearing *ap sc* and shorter *la sc*. Pleura smooth, shining. *mpl* without hairs. *stpl* with few hairs.

Legs long and slender, simple. Tibial organ narrow, oval. Femoral organ absent.

Wings with 2—3 transverse dark bands. r_{2+3} short, procurved. r_{4+5} procurved. Posterior of discal cell and close to m_{3+4} is a distinct, vein-like structure. Halteres yellow.

Abdomen with segment 1—2 long and narrow, with a longitudinal weakened area in middle. T_2 and T_5 short, T_4 long oval. In male S_{7+8} linear with 2 distinct spiracles. Surstyli large, bifid. Hypandrium transverse with distinct anterolateral projections. Phallapodemic sclerite small.

Distribution: Oriental Region.

Material studied: *Sepsidoscinis maculipennis* Hendel.

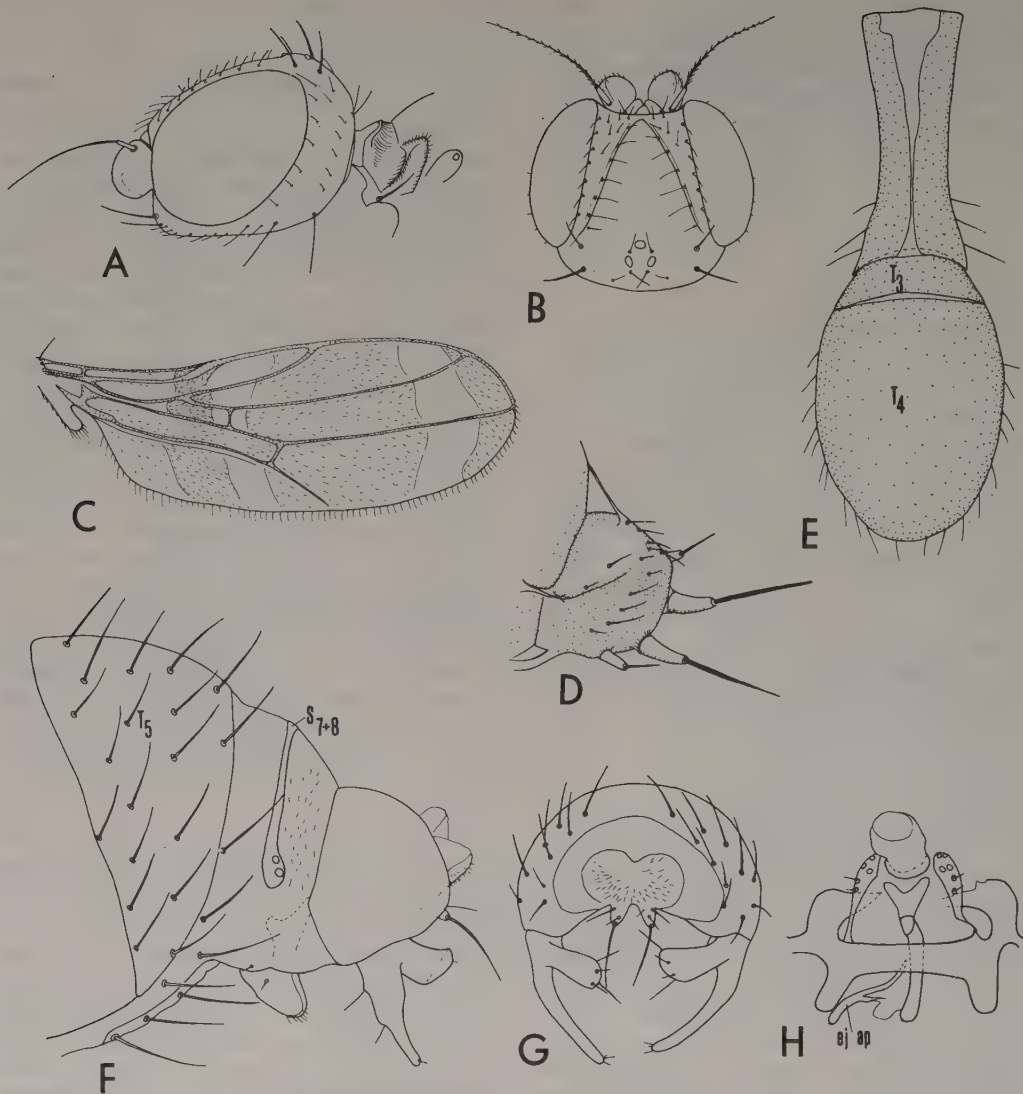


Fig. 37. — A—H. *Sepsidoscinis maculipennis* Hendel. — A. Head and prothorax, lateral view. — B. Head, dorsal view. — C. Wing. — D. Scutellum, dorso-lateral view. — E. Male abdomen, dorsal view. — F. Posterior end of male abdomen, lateral view. — H. Phallic complex, ventral view.

The *Gaurax* genus group

The *Gaurax* genus group is close to the *Elachiptera* genus group and the similarity of the the species of the two groups is sometimes striking. Duda (1930) has stressed the similarities and indistinct limits between *Elachiptera*, *Melanochaeta* and *Gampsocera*.

Common features of the two groups are: upright, cruciate *oc* (note: the *oc* in *Pseudogaurax* is upright and more distinctly conver-

gent or cruciate than is shown in fig. 40 C), usually kidney-shaped or obliquely oval *ant*₃ and densely haired or thickened arista, and well-developed tibial organs.

Differences are in particular the oval eyes with vertical long axes of the *Gaurax* group and the male genitalia which among the *Gaurax*-related genera are not of *Elachiptera*-type. Femoral organs are also absent.

The genus *Gaurax* Loew has round or reniform *ant*₃, slender more or less thickly haired

eyes, simple, rounded, convex scutellum, and very multiform male genitalia. The cerci are separated and usually long and projecting, the surstyli are of complex structure with various projections and the hypandrium, pregonites and postgonites fused into a ridged structure.

Gampsocera Schiner has a phallic complex of the same rigid type as *Gaurax* but the epandrium is flat, apically broad, with simple surstyli and only indistinct traces of the cerci. The ant₃ is oblique with thickened, densely haired, apically inserted arista. The scutellum is simple, rounded and convex.

Pseudogaurax Malloch has ant₃ and arista of the same type as *Gampsocera*, however often even more prolonged. The scutellum is prolonged, sometimes extremely so, triangular, dorsally flat. In the male genitalia the epandrium is of the normal bowl-shape type, with distinct but basally fused cerci, simple surstyli and a phallic complex with normally discrete elements.

I provisionally associate *Cestoplectus* with this genus group. I have not seen the male genitalia. It possibly belongs to the *Elachiptera* genus group.

Genus *Gaurax* Loew, 1863: 35

Figs 38, 113 D.

Type species: *Gaurax festivus* Loew, 1863.

Synonymy: *Botanobia* Lioy, 1864: 1125, type species: *Oscinis dubia* Macquart, 1835; *Neogaurax* Malloch, 1914: 119, type species: *Gaurax montanus* Coquillett, 1898 (Sabrosky 1951).

Small, 1.5–2.5 mm, species black or yellow with black markings and with naked or hairy eyes, shining frontal triangle and rounded scutellum.

Head somewhat higher than long, yellow to black, with distinct dark or pale hairs and bristles. Eyes rounded oval with vertical or oblique long axes, distinctly hairy or naked but sometimes with sparse short hairs (as in *dubia* Macq.). Jowls narrow to very narrow, narrower than t₁, dusted, usually with silvery dust, with one row hairs. vi distinct. Vibrissal angle usually rounded. Cheeks not visible. Frons somewhat projecting, broader than long, subshining, with few fr. Frontal triangle of moderate size, behind 2/3 as broad as frons with straight side margins reaching about middle of frons, smooth, shining. if rather long, in one row along the margin of the triangle, incurved. oc rather short, about as long as if, upright,

cruciate. Vertical bristles subequal, about twice as long as oc. pvt upright, cruciate. vti incurved. vte outcurved. orb 5–8 rather long, recurved, the posterior one especially long, as long as vti. Face concave with short, indistinct, in upper part triangular carina. Proboscis short. Palpi short, cylindrical, yellow or black. Antennae white, yellow or black of rather variable shape. ant₂ short. ant₃ oval, reniform and much higher than long, or rounded, as high as long, distinctly pubescent. Arista usually with rather long and dense pubescence.

Thorax black or yellow with black markings, shining, with distinct pale or dark hairs and bristles. Humerus hairy with 1 h. Mesonotum moderately convex, smooth, covered by numerous, usually rather long and erect hairs, usually distinctly parted along dc (and also acr) lines. Thoracal bristles long and slender. 1 a npl, 1 strong and 1 small or 2 strong p npl, 1 a pa, 1 small, hair-like p pa, 1 dc. Scutellum rounded, convex, yellow or black, shining, with numerous hairs on the disc. ap sc long, at least as long as scutellum, 1–2 la sc. Pleura smooth, shining, in yellow species with 1 or more dark spots. mpl without hairs. stpl with few hairs.

Legs slender, simple, pale or more or less black. Tibial organ distinct, oval. Femural organ not present.

Wings rather broad. Wing membrane thin with rather long microchaetae. Halteres yellow or black.

Abdomen oval, dark, subshining, dusted, with dark hairs. Female cerci long, slender. Male with large epandrium, often long cerci and broad and long surstyli with long bristles and of complex structure.

Distribution: Recorded from all faunal regions.

Material studied: *Gaurax dubia* (Macquart); *G. fascipes* Becker, 1910; *G. maculipennis* (Zetterstedt, 1848); *G. kurilensis* Nartshuk, 1973; *G. paradoxopyga* Nartshuk, 1966.

Genus *Gampsocera* Schiner, 1862: 431

Figs 39, 113 E.

Type species: *Chlorops numerata* Heeger, 1858.

Small to medium size, 2–3 mm, *Elachiptera*-like species with obliquely prolonged ant₃ and terminal, thickened arista.

Head squarish, higher than long, yellow or partly dark, with distinct hairs and bristles. Eyes large, rounded or rounded oval densely hairy, with oblique or vertical long axes and

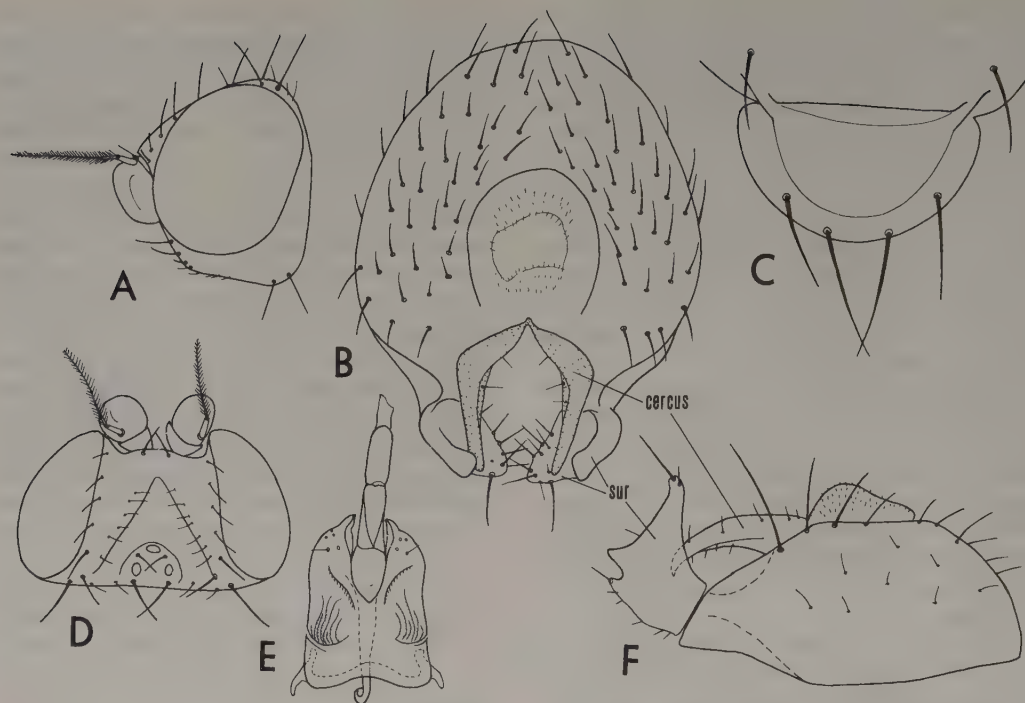


Fig. 38. — A—B. *Gaurax dubia* (Macquart). — A. Head, lateral view. — E. Epandrium, posterior view. — C—F. *Gaurax fascipes* Becker. — C. Scutellum, dorsal view. — D. Head, dorsal view. — E. Phallic complex. — F. Epandrium, lateral view.

with anterior ommatidia usually larger. Jowls narrow, about as broad as t_1 , shining with one, behind more rows of hairs, the anterior hairs becoming increasingly larger anteriorad and slightly shorter than the distinct *vi*. Cheeks absent. Frons somewhat projecting, broader than long, dusted with few *fr*. Frontal triangle of medium size, behind about 2/3 as broad as frons, with somewhat convex side margins reaching to middle or 2/3 of frons, yellow or darkened, smooth, shining. *if* rather long, in one row along the margin. *oc* distinct, upright, cruciate. Vertical bristles subequal. *pvt* upright, cruciate. *vii* incurved. *vte* out-curved. *orb* distinct, about 6, the posterior 2—3 distinctly longer. Face concave, narrow, with distinct narrow carina reaching middle of face. Clypeus yellow or black, shining or dusted. Proboscis short, palpi cylindrical, yellow or blackish. Antennae yellowish more or less darkened above. ant_2 small or short but broad. ant_3 prolonged, obliquely kidney-shaped or conical, pubescent, with terminal thickened dark arista. Basal segments of arista with shorter or longer pubescence. Flagellum short

and moderately thickened or long and strongly thickened, with long dense pubescence.

Thorax yellow, usually with brown or black markings to almost completely black, shining with distinct pale or dark hairs and bristles. Humerus with or without spot, hairy, with more or less distinct *h*. Mesonotum rather flat, shining, smooth with rather long, not especially dense hairs which are parted along *acr* and *dc* lines. Thoracal bristles distinct, slender. $1\ a\ npl$, $2\ p\ npl$, $1\ a\ pa$, 1 small $p\ pa$, 1 *dc*. Scutellum rounded, convex, shining, with few hairs above. *ap sc* about as long as scutellum. 1—2 *la sc*. Pleura smooth, mostly shining. *mpl* dusted in posterior half, without hairs. *stpl* shining with few hairs.

Legs slender, yellow or more or less blackish, simple. Tibial organ distinct oval. Femural organ absent.

Wings of Oscinellinae-type, rather broad, hairy, especially along margins. Wing membrane not coloured or with various black or brown spots. Veins sometimes curved near the spots. Halteres yellow.

Abdomen oval, thinly dusted, subshining,

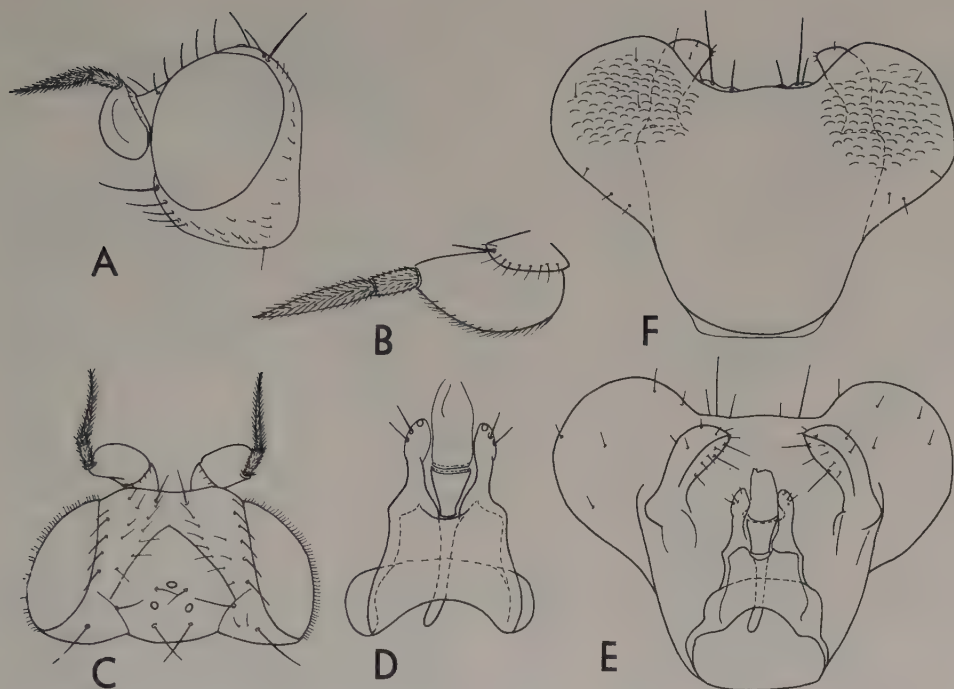


Fig. 39. — A—C. *Gampsocera numerata* (Heeger). — A. Head, lateral view. — B. Antenna, inner side. — C. Head, dorsal view. — D—F. *Gampsocera* cf. *maculipennis* Becker. — D. Phallic complex, ventral view. — E. Hypopygium, ventral view. — F. Epandrium, dorsal view.

with pale or dark hairs. Female cerci long and slender. Male genitalia with fused phallic complex, simple surstyli, small cerci and flattened epandrium.

Distribution: Palearctic and Oriental Regions; South America.

Material studied: *Gampsocera numerata* (Heeger), *G. cf. maculipennis* Becker, 1911; *G. mutata* Becker, 1911.

Genus *Pseudogaurax* Malloch, 1915: 159

Figs 40, 113 F.

Type species: *Gaurax anchora* Loew, 1866.

Medium size, 2—4 mm, predominantly yellowish species with obliquely prolonged ant_3 , thickened, pubescent arista and long triangular scutellum.

Head higher than long, usually yellow with pale hairs and bristles. Eyes large, semicircular, with curved anterior and straight posterior margin or somewhat narrowed below, with vertical long axes, distinctly hairy. Jowls narrow to linear, dusted, with one row of hairs.

vi indistinct. Cheeks absent. Frons not projecting, broader than long or longer than broad, flat or concave, subshining, with few *fr*. Frontal triangle large, behind almost as broad as frons, with straight side margins reaching front of frons, smooth, shining, usually yellow. *if* in one row on the margin of the triangle, long slender, incurved. *oc* short, long as *if*, upright, cruciate. *pvt* very strong, almost as long as width of frons, upright, cruciate. *vti* indistinct, hair-like. *vte* long as *pvt*, outcurved. About 5—6 distinct, recurved *orb*. Face narrow, sloping, flat or shallowly concave, shining, lower margin somewhat projecting. Facial carina low indistinct, or broad, reaching middle of face. Clypeus yellow, shining. Proboscis of medium size. Palpi rather long, cylindrical, yellow, shining. Proboscis of medium size. Palpi rather long, cylindrical, yellow. Antennae yellow, more or less darkened above and at tip. ant_2 somewhat assymetrical, longer above than below, with long dorsal bristle. ant_3 reniform with upper corner strongly prolonged, distinctly pubescent. Arista terminal, thickened, black, with long, dense pubescence, first basal seg-

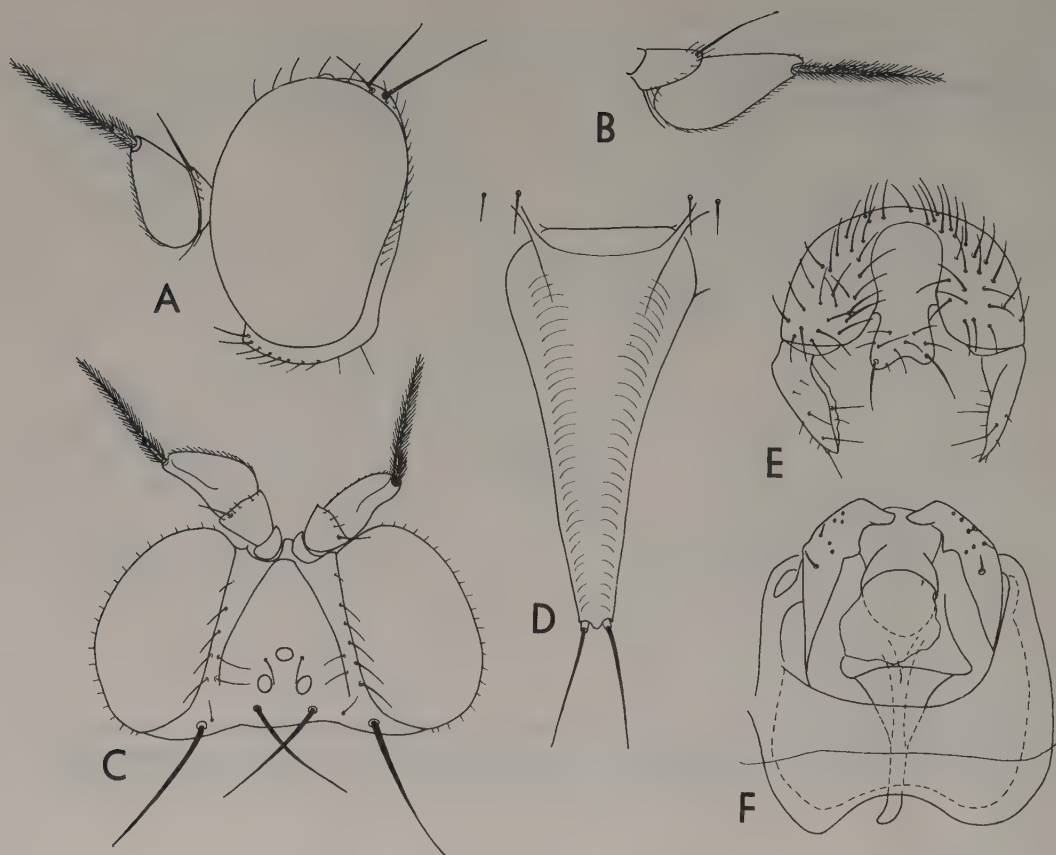


Fig. 40. — A—F. *Pseudogaurax sicarius* (Lamb). — A. Head, lateral view. — B. Antenna, inner side. — C. Head, dorsal view. — D. Scutellum, dorsal view. — E. Epandrium, posterior view. — F. Phallic complex, ventral view.

ment very short but visible, second basal segment relatively long, densely pubescent, flagellum moderately long about 1.5—2.5 times length of basal segments.

Thorax yellow, with red, brown or black markings, and pale hairs and bristles, shining. Humerus with numerous hairs and indistinct *h*. Mesonotum, flattened, covered with numerous pale hairs arising from distinct granulae causing coarse microsculpture. Hairs along *acr* and *dc* lines distinctly parted. Thoracic bristles well developed. 1 *a npl*, 1 *p npl*, 1 *a pa*, 1 hair-like *p pa*, 1 *dc*. Scutellum prolonged, triangular or conical, longer than broad, sometimes considerably so, thick, flattened, shining, on dorsal and lateral sides evenly covered with numerous hairs arising from small granulae. *ap sc* distinct, at tip of scutellum, rather close together, arising from distinct warts. *la sc* indistinct. Pleura smooth, shining. *mpl* without hairs. *stpl* with numerous hairs.

Legs long and slender, simple, yellow, or partly darkened. Tibial organ distinct, short oval. Femoral organ absent.

Wings of Oscinellinae-type. *t_p* rather oblique. Halteres yellow.

Abdomen oval, rather narrow, pale, dusted above, with short hairs. Female cerci long and slender. Male genitalia with fused cerci, simple surstyli and apically hooked postgonites.

Distribution: Uncertain. At least present in N. America and Africa.

Material studied: *Pseudogaurax sicarius* (Lamb, 1937); *P. longicornis* Sabrosky, 1946.

Genus *Cestoplectus* Lamb, 1918: 390

Figs 41, 113 G.

Type species: *Cestoplectus intruens* Lamb, 1918.

Small, 2.5 mm, yellowish species with extremely short frontal triangle, densely hairy eyes and very broad head.

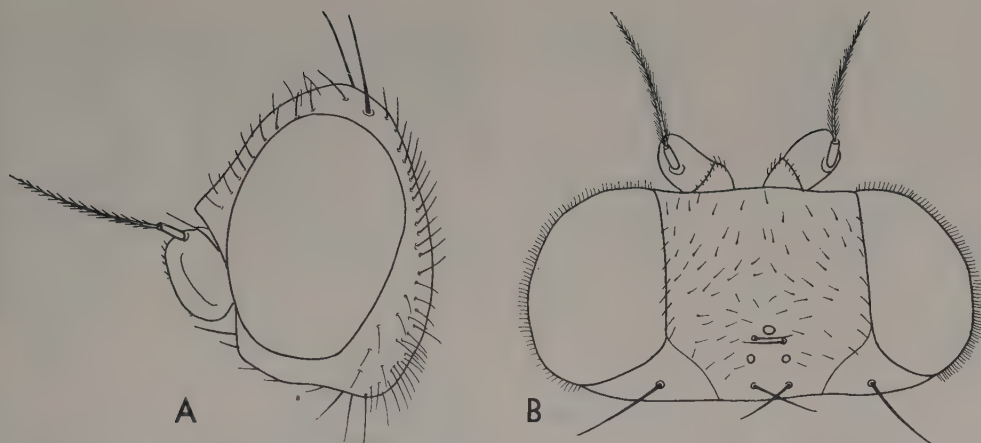


Fig. 41. — A—B. *Cestoplectus intruens* Lamb. — A. Head, lateral view. — B. Head, dorsal view.

Head much higher than long, very broad, yellow with brownish hairs and bristles. Eyes oval with vertical long axes and very dense pilosity. Jowls narrower than t_1 , dusted, with one row of pale hairs. vi short, pale. Cheeks not visible. Frons hardly projecting, broader than long, dusted, covered with numerous *fr*. Frontal triangle extremely small, reaching in front of anterior ocellus only as long as breadth of ocellus, shining, yellow. *if* indistinct. *oc* somewhat longer than *fr*, upright, cruciate. *pvt* bristle-like, about three times as long as *oc*, upright, cruciate. *vti* indistinct. *vte* somewhat stronger than *pvt*, outcurved. About 10 indistinct, recurved *orb*. Face short, with distinct, triangular carina, long as $2/3$ the height of face. Clypeus broad, pale, dusted. Proboscis short. Palpi short, cylindrical, black. ant_2 very short, yellow, with distinct bristle. ant_3 oval, about twice as high as long, black, pubescent. Arista dark, slender, distinctly pubescent.

Thorax brownish yellow with dark markings, pale hairs and brownish bristles. Humerus without spot, hairy, without distinct *h*. Mesonotum moderately convex, smooth, dusted, evenly covered by numerous short hairs, with four longitudinal dark stripes, two in the middle; the lateral interrupted at mesonotal suture. 1 *a npl*, 2 *p npl*, 1 rather long *a pa*. *p pa* and *dc* indistinct. Scutellum rather large, rounded, somewhat flattened, dusted, hairy on the disc. *ap sc* almost as long as scutellum. 2 distinct *la sc*. Pleura smooth, partly dusted. *mpl* and *ptpl* partly dusted with thick, felt-like dust. *stpl* shining, with dark spot and pale hairs.

Legs long and slender, simple, yellowish,

somewhat darkened. Tibial organ large, oval.

Wings large, rather broad, of *Gaurax*-type. t_a inside tip of r_1 . Halteres yellow.

Abdomen oval, brownish, dusted with pale hairs.

Distribution: Oriental Region.

Material studied: *Cestoplectus intruens* Lamb, ♀.

The *Dicraeus* genus group

Nartshuk (1967) published a comprehensive study of the genus *Dicraeus* Loew, which she considers to be somewhat apart from other Oscinellinae genera though related to *Aphanotrigonum*, *Tricimba* and *Tropidoscinis*. However, I do not consider that these three genera form a particularly close unit. Undoubtedly *Dicraeus* as the only representative of the *Dicraeus* genus group is an isolated taxon, with the following characteristics: a long vein r_{2+3} ; tendency to reduction of the costa beyond the tip of r_{4+5} so that it does not always reach m_{1+2} ; tendency to reduction of t_p ; a strong, outcurved, posterior *orb* (a true *ors*?) at a distinctly larger distance from the anterior *orb* than these are from each other; a large hypandrium with fused hypandrial arms; cerci in an extreme lateral position, largely or almost completely reduced; and large or very long, often complex surstyli. The species have a very short flight period (*Dicraeus vagans* Meig. in Sweden about one week) and the larvae develop in the flowers of grasses.

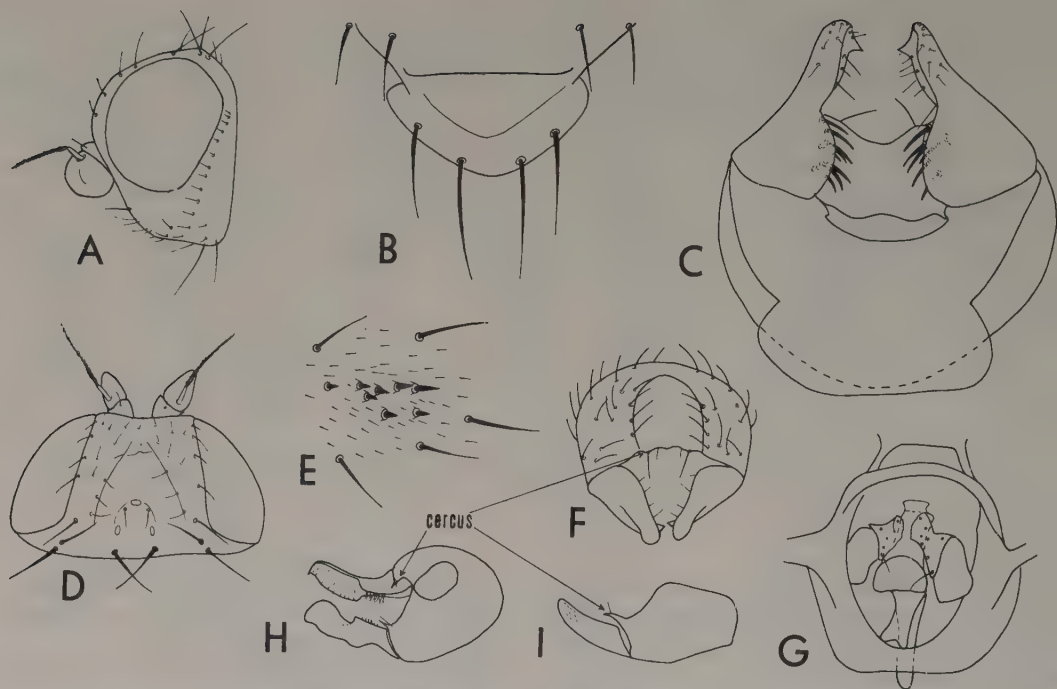


Fig. 42. — A—G. *Dicraeus* (*Paroedesiella*) *vagans* (Meigen). — A. Head, lateral view. — B. Scutellum, dorsal view. — C. Epandrium, ventral view. — D. Head, dorsal view. — E. Femoral organ. — F. Epandrium, posterior view. — G. Phallic complex, ventral view. — H. *Dicraeus* (*Eudicraeus*) *fennicus* Duda, epandrium, postero-lateral view (after Nartshuk 1967). — I. *Dicraeus* (*Dicraeus*) *raptus* (Haliday), epandrium, lateral view (after Nartshuk 1967).

Genus *Dicraeus* Loew, 1873: 51

Figs 42, 113 H.

Type species: *Oscinis raptus* Haliday, 1940, as *Dicraeus obscurus* Loew, 1873 (Sabrosky 1941).

Synonymy: *Dicraeinus* Enderlein, 1936: 186, type species: *Eutropha ingratus* Loew, 1866; *Paroedesiella* Enderlein, 1936: 187, type species: *Oscinis styriacus* Strobl, 1898 (Sabrosky 1941); *Oxyapium* Becker, 1912: 250, type species: *Oxyapium longinerve* Becker, 1912 (Sabrosky 1951); *Eudicraeus* Nartshuk 1967: 426, type species: *Dicraeus rossicus* Stackelberg; *Parastia* Pandellé, 1898: 18 (Sabrosky 1964).

Small to medium size, 1.5—3 mm, black or indistinctly yellowish species with broad jowls, long r_{2+3} and large to very long surstyli.

Head rounded black or more or less yellow, higher than long. Eyes rounded with vertical long axes, and short, rather sparse hairs. Jowls broad, usually broader than ant_3 , shining, with one or more rows of hairs in lower part. *vi* distinct, short. Cheeks narrow. Frons slightly projecting, about long as broad, usually narrower in front, subshining or dusted with few

fr. Frontal triangle rather large, behind more than $2/3$ as wide as frons, with straight side margins reaching from middle to front of frons, smooth, dusted, yellow to black. *if* rather long, along the margin of the triangle. *oc* short, about as long as *if*, recurved, convergent. Vertical bristle subequal, distinctly longer than *oc*. *pvt* upright, cruciate. *vti* incurved. *vte* outcurved. 6—8 recurved *orb*, the posterior 3—4 usually distinctly longer. Anterior of *vti* one stronger, outcurved bristle. Face narrow, with rather low, indistinct carina, triangular between the antennae and reaching middle of face. Clypeus yellow or black, dusted. Proboscis short. Palpi slender, short, yellow or black. Antennae yellow, more or less dark or completely black. ant_2 short with distinct bristle. ant_3 rounded oval, higher than long. Arista dark, shortly pubescent.

Thorax yellowish to black. Humerus dusted with few hairs and distinct *h*. Mesonotum rather convex, smooth, dusted, evenly covered by numerous short hairs. Thoracal bristles long and slender, subequal. 1 *a npl*, 1 *p npl*, 1 *a pa*,

1 *p pa*, 1 *dc*. Scutellum rounded, convex, dusted, with a few hairs, *ap sc* as long as scutellum. 1 long *la sc*. Pleura shining or extensively dusted. *mpl* without hairs. *stpl* with few hairs.

Legs slender, simple, dark or yellowish. Femoral organ formed by a group of more or less numerous warts with short, stout spines. Tibial organ distinct, rather narrow.

Wings large. Costa reaching only slightly beyond tip of r_{4+5} or to tip of m_{1+2} . r_{2+3} very long. Ratios of costal segments of the magnitude 20 : 54 : 12 : 7. Halteres yellow.

Abdomen oval, dusted, with dark or pale hairs. Female cerci long. Male genitalia often very large, with short and broad or extremely prolonged surstyli, simple or of more complex structure. Hypandrial arms fused. Phallus short. Gonites small. Male cerci reduced or present as narrow projections above surstyli.

Distribution: Holarctic, Ethiopian and Oriental Regions.

Material studied: *Dicraeus raptus* (Haliday); *D. tibialis* (Macquart, 1835); *D. vagans* (Meigen, 1838); *D. fennicus* Duda, 1933; *D. styriacus* (Strobl).

Remarks: Nartshuk (1967) grouped the *Dicraeus*-species into three subgenera: *Dicraeus* s. str. with distinct slender cerci in a lateral position near the bases of surstyli and fairly long, slender, simple surstyli; *Paroedesiella* Enderlein without cerci or with small remnants of them in a more median position and short, broad surstyli with stout spine-like bristles; *Eudicraeus* Nartshuk with small narrow cerci in a lateral position and long surstyli with complex shape and groups of hairs and spinous bristles.

The *Lipara* genus group

To this group belong genera with densely haired eyes, densely haired frons and usually numerous *if* on the frontal triangle and re-curved *oc*. The facial carina is distinct and often exceptionally broad. ant_2 is cup-shaped enlarged and encloses large parts of the base of the relatively small ant_3 . The mesonotum is covered by an unusually thick coat of short hairs, usually evenly dispersed, but sometimes parted along *acr* and *dc* lines. *stpl* are densely haired, *mpl* normally dusted with wrinkled sculpture. The male genitalia have common features and the femoral organ consists of an oval or round group with unchanged or only

diminished bristles and a distinct tibial organ is present.

The genus *Pseudeurina* de Meijere differs from the other genera in having a yellow ground colour, bare frontal triangle, erect, cruciate *oc* and no tibial organ. The structure of the head and antennae are otherwise very similar to that of *Lipara*, and so are the general body shape and the wings, for which reason I do not hesitate to place it in this group. The male cerci are not fused basally and the apical, medially directed lobe of the postgonites is similar to that in *Siphonella*. *Pseudeurina miscanthi* (Nartshuk), like the *Lipara* spp., is a gall-maker.

Lipara Meigen has black species of a type characteristic for the group. The scutellum is prolonged, triangular, thick but without distinct warts at the bases of the scutellars.

Calamoncosis Enderlein contains black species very similar to small *Lipara* species. They are not gall-makers, have fused male cerci like *Lipara*, but narrow facial carina. The scutellum can be short but is usually prolonged, triangular and the scutellars arise from more and less distinct warts. The jowls are narrower than in *Lipara* and the proboscis is sometimes prolonged.

Siphonella Macquart is in general shape very close to *Calamoncosis* and the two genera have sometimes been synonymized. The main differences are the following features of *Siphonella*: palpi and proboscis unusually long; cheeks distinct; mesolobus deeply cleft; postgonites with apical, medially directed lobe; and femoral organ consisting of a group approximated macrochaetae of almost unchanged shape and length. Furthermore, *Siphonella* is parasitic on spiders' eggs while *Calamoncosis* is phytophagous.

Also the genus *Anomoeoceros* Lamb is in general habitus very similar to *Calamoncosis*. The most striking differences are the prolonged antennae and the lack of femoral organ.

Genus *Pseudeurina* de Meijere, 1904: 112

Figs 43, 44, 113 J, 114 A.

Type species: *Pseudeurina maculata* de Meijere, 1904.

Synonymy: *Gallomyia* Nartshuk, 1965: 200, type species: *Gallomyia miscanthi* Nartshuk, 1965, n. syn.

Medium size, 4–5 mm, yellow species, with a few brown to black spots, densely pubescent

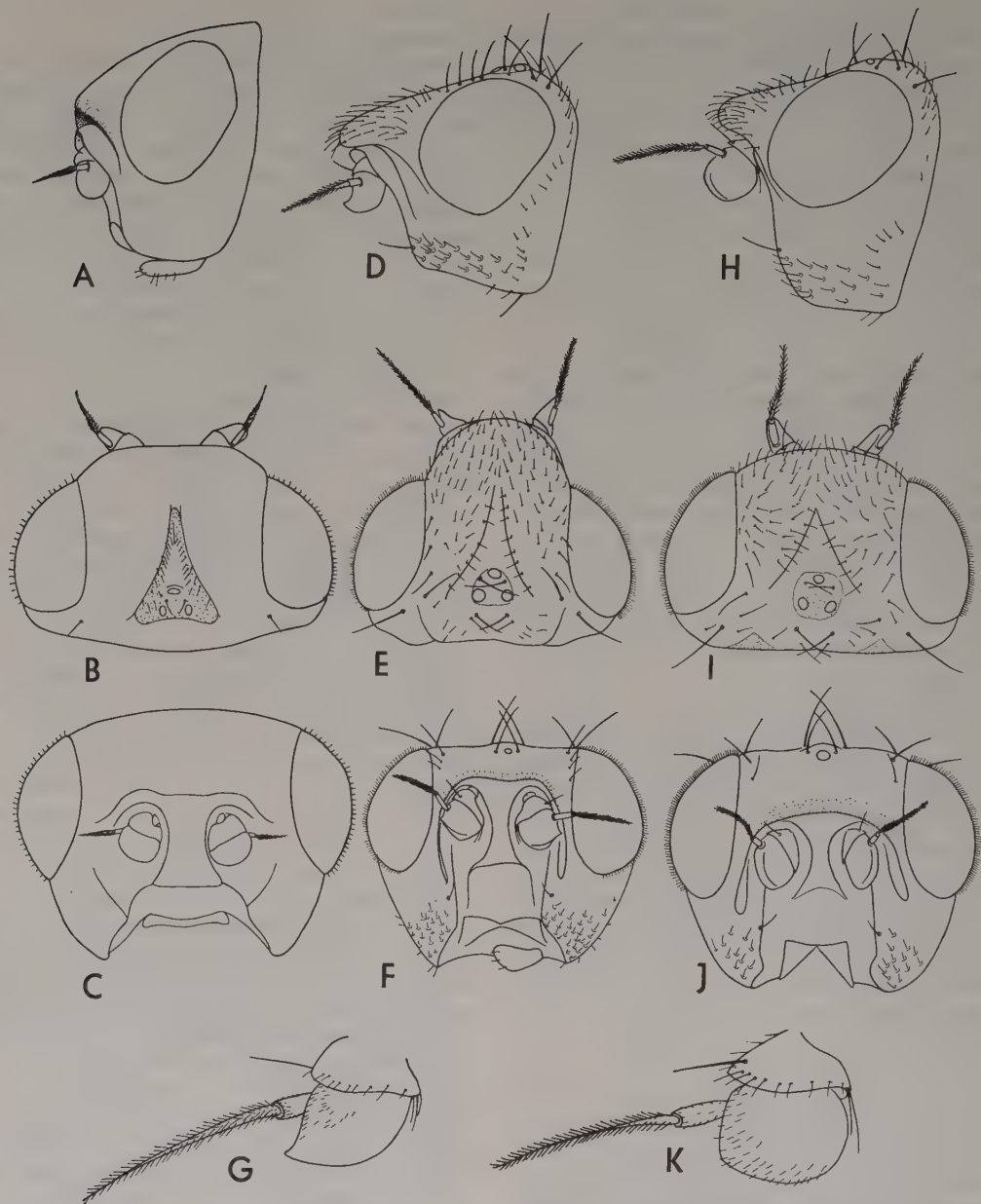


Fig. 43. — A—C. *Lipara lucens* Meigen. Hairs omitted. — D—G. *Pseudeurina maculata* de Meijere. — H—K. *Pseudeurina miscanthi* (Nartshuk). — A, D, H. Heads, lateral view. — B, E, J. Heads, dorsal view. — C, F, I. Heads, anterior view. — G, K. Antennae, outer side.

eyes, broad facial carina and apical 3rd of t_3 black.

Head about high as long, yellow with distinct black hairs and bristles. Eyes squarish oval with oblique long axes, densely hairy. Jowls broad, not quite half as broad as height of eyes, ratio 2 : 5, winkled, shining, with numer-

ous dark hairs in distinct punctures on lower half, otherwise smooth, naked, dusted. *vi* distinct, black. Cheeks broad. Frons strongly projecting, longer than broad, dusted, longitudinally striated, with numerous *fr*. Frontal triangle small and narrow, behind half as broad as width of frons, with concave side margins

reaching at least $2/3$ length of frons, smooth, yellow, dusted. *if* in one row along the margin of the triangle, incurved. *oc* distinct, bristle-like, upright, cruciate. *pvt* somewhat stronger, upright, cruciate. *vti* somewhat smaller, incurved. *vte* strong as *pvt*, outcurved. Anterior *orb* indistinct recurved, 1—3 of the posterior ones stronger, bristle-like. Face sloping. Facial carina flat, broad, reaching middle of face. Epistoma large, higher than broad. Clypeus yellow, shining. Proboscis very short. Palpi cylindrical, yellow. Antennae yellow. *ant*₂ not prolonged, large, with distinct bristle. *ant*₃ with projecting upper corner, as long as broad, with short pubescence. Arista dark, slender, pubescent.

Thorax yellow with brown spots and well-developed hairs and bristles. Humerus without distinct spot, hairy, with 1—3 more distinct *h*. Mesonotum moderately convex, yellow, with 3—5 more or less confluent brown stripes, smooth, dusted, evenly covered with black hairs. Thoracal bristles rather long and slender, subequal. 1 *a npl*, 1 *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*. Scutellum rounded, convex, yellow with central darkening, dusted, smooth, with some hairs above. *ap sc* distinct, almost as long as scutellum. 2 long *la sc*. Pleura smooth. *mpl* dusted, shining in anterior part, with 1 black spot below, without hairs. *ptpl* dusted with 1 shining dark spot below. *stpl* with indistinct spot, shining, with few hairs.

Legs rather long, yellow. *t*₃ somewhat thickened at tip, black in apical third, without tibial organ. Hind feet with apical 3 segments black. Femoral organ an oval group of granulae with short slender tips.

Wings of *Lipara*-type. Halteres yellow.

Abdomen oval, dorsally brownish with rounded yellow lateral spots, dusted with dark hairs. Female cerci short. Epandrium with cerci and surstyli *Lipara*-like. Postgonites with 4—5 long bristles, apically with a proximally directed projections and posterior to it an excavation.

Distribution: Oriental and Eastern Palaearctic Regions.

Material studied: *Pseudeurina maculata* de Meijere; *Pseudeurina miscanthi* (Nartshuk, 1965) n. comb.

Remarks. The genus *Gallomyia* Nartshuk, 1965, is very close to *Pseudeurina* de Meijere. The general habitus and colour (inclusive of the black tip of *t*₃) are the same, and other structures such as bristles, hairs, dusting, structure of face, male genitalia, are very much the

same. The differences, shorter and broader frons, broader jowls and more rounded *ant*₃ cannot justify *Gallomyia* as a distinct genus.

Genus *Lipara* Meigen, 1830: 1

Figs 43, 44, 113 I.

Type species: *Lipara lucens* Meigen, 1830.

Synonymy: Sabrosky (1941) has discussed the possible synonymy with *Gymnopoda* Macquart, 1835, and *Calamoncosis* Enderlein, 1911. See under *Calamoncosis*.

Large, 3—7 mm, stout black species with hairy eyes, large, broad facial carina and yellow or white hairs on thorax.

Head higher than long, black, shining or dusted with numerous short yellow or whitish hairs and indistinct bristles. Eyes relatively small, rounded oval with oblique to almost vertical long axes, distinctly hairy. Jowls broad, $1/3$ — $1/2$ height of eye, wrinkled, shining in anterior lower part, covered over most parts with numerous hairs. Vibrissal angle not projecting. *vi* indistinct. Cheeks distinct. Frons projecting, broader than long, shining or dusted, with very numerous *fr* arising from more or less distinct punctures. Frontal triangle small, behind about as broad as half width of frons with indistinct, concave side margins reaching $1/2$ — $2/3$, or as a narrow stripe, almost to front of frons, shining or thinly dusted, with wrinkled microsculpture and numerous incurved *if* all over the surface. *oc* short as *if*, recurved, convergent. *pvt* and *vti* indistinct hair-like. *vte* short, usually more distinct, outcurved. *orb* numerous, short and indistinct, recurved. Face with very large and broad, flat, dusted carina, as broad below as above, narrower at middle, reaching epistoma. Epistomal field large. Clypeus broad black, dusted or shining. Proboscis short. Palpi short, cylindrical, black. Antennae reddish to black. *ant*₂ large, covering base of *ant*₃. *ant*₃ rounded oval, higher than long, with short pubescence. Arista short, dark, basal segments thick, flagellum slender, pubescent.

Thorax black, not dusted, with yellow or whitish hairs and indistinct, pale or dark bristles. Humerus with numerous hairs, without distinct *h*. Mesonotum moderately convex, covered all over with long or short hairs, arising from distinct granulae, causing coarse microsculpture, dusted or shining. The hairs sometimes distinctly parted along *acr* and *dc* lines. 1 *a npl*, 1—2 *p npl*, 1 *a pa*, 1 *p pa*, all indistinct or short. *dc* indistinct. Scutellum

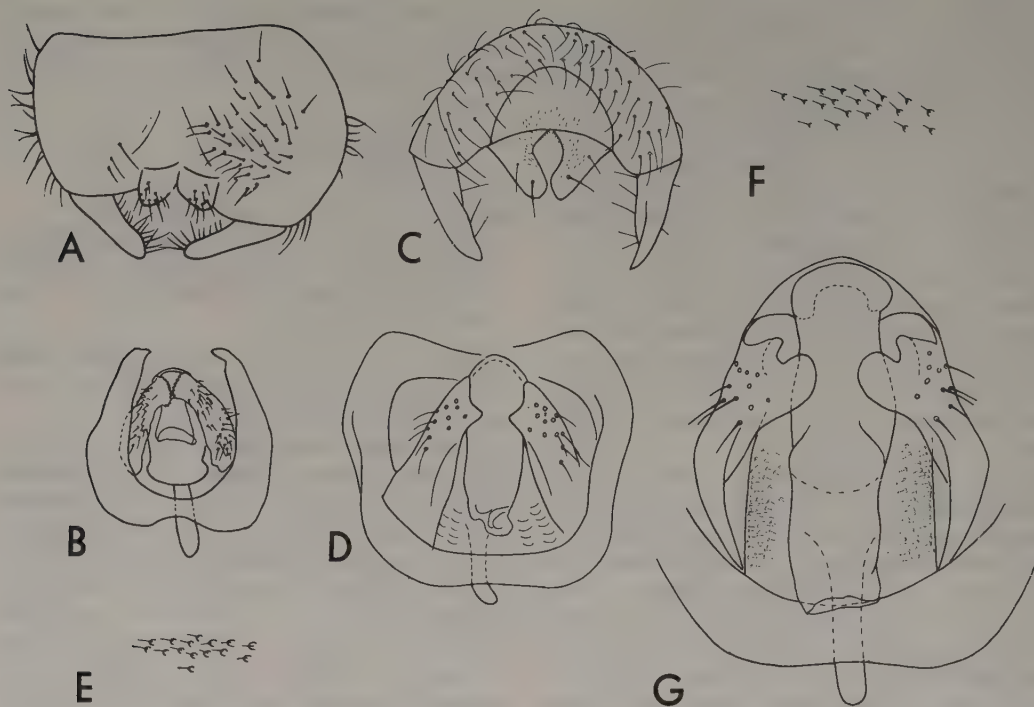


Fig. 44. — A—B. *Lipara lucens* Meigen. — A. Epandrium, posterior view. — B. Phallic complex, ventral view. — C—E. *Pseudeurina maculata* de Meijere. — C. Epandrium, posterior view. — D. Phallic complex, ventral view. — E. Femoral organ, f_2 . — F—G. *Pseudeurina miscanthi* (Nartshuk). — F. Femoral organ, f_2 . — G. Phallic complex, ventral view.

large, triangular, convex, thick, densely covered with pale hairs, not dusted. *ap sc* and 1—3 *la sc*, often very indistinct, pale, or more distinct, black. Subscutellum well developed. Pleura with coarse wrinkled or granulate microsculpture, dusted or shining. *mpl* without hairs. *stpl* with numerous hairs.

Legs short, stout, simple, black, partly reddish. Tibial organ formed by an oval group of warts.

Wings brownish with coarse dark or yellowish veins. t_p rather oblique. r_{4+5} and m_{1+2} recurved. Halteres black.

Abdomen oval, black, dusted or thinly dusted and subshining, with pale hairs. Sternites broad. Female cerci short. Surstyli broad, male cerci sometimes united, mesolobus-like. Postgonites large hairy, serrated in posterior end.

Distribution: Europe; introduced to N. America.

Material studied: *Lipara lucens* Meigen; *L. pullitarsis* Doskočil and Chvála, 1971.

Remarks. Doskočil and Chvála (1971) have revised the palaearctic species of *Lipara*. The four species *L. lucens* Meigen, 1830, *L. similis*

Schiner, 1854, *L. pullitarsis* Doskočil and Chvála, 1971, and *L. rufitarsis* Loew, 1858, form a distinct group with common features in the build of head, especially eyes, jowls and facial carina, scutellum, wings and male genitalia. The group is not quite homogeneous: *lucens* Meig. is distinctly more dusted with heavily dusted *mpl* and *stpl*; *lucens* Meig. and *similis* Schiner has longer, distinctly parted hairs on mesonotum in contrast to *pullitarsis* Dosk. & Chvá. and *rufitarsis* Loew which like the species of *Calamoncosis* are shining black with short evenly dispersed hairs on mesonotum.

Genus *Calamoncosis* Enderlein, 1911: 11

Figs 45, 114 B.

Type species: *Lipara rufitarsis* Loew, 1858 (probable misidentification of *Lipara minima* Strobl, 1893).

Synonymy: *Stizambia* Enderlein, 1936: 187, type species: *Chlorops aprica* Meigen, 1830 (designation Sabrosky 1941).

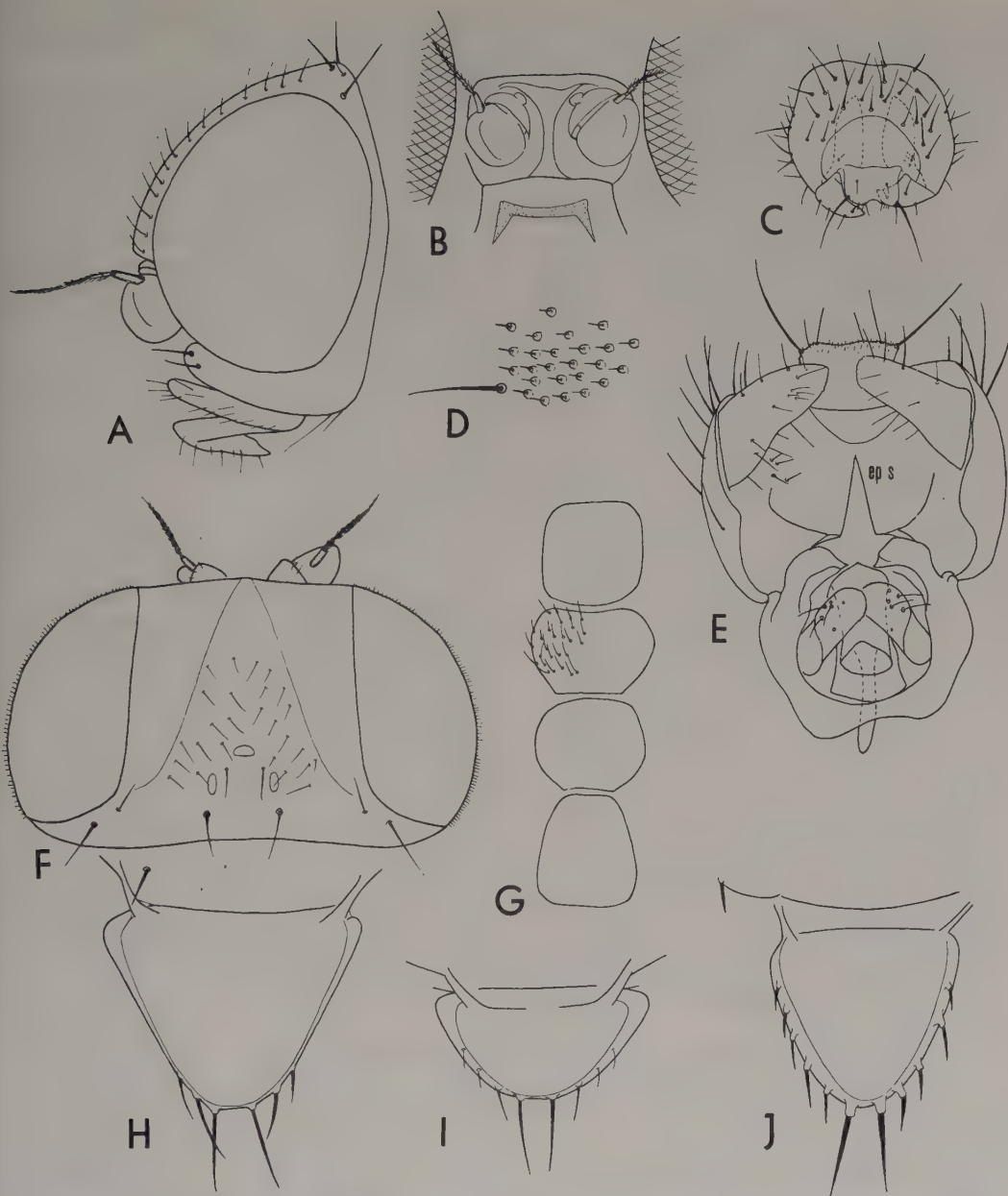


Fig. 45. — A—H. *Calamoncosis minima* Strobl. — A. Head, lateral view. — B. Face, anterior view. — C. Epandrium, posterior view. — D. Femural organ. — E. Male genitalia, ventral view. — F. Head, dorsal view. — G. Male S_2 — S_5 , bristles only partly figured. — H. Scutellum, dorsal view. — I. *Calamoncosis duinensis* (Strobl), scutellum, dorsal view. — J. *Calamoncosis aspistylina* Duda, scutellum, dorsal view.

Small to medium size, 2.5—3.5 mm, black species with distinct, narrow carina, hairy eyes, numerous *if* on the shining frontal triangle.

Head black with dark bristles and hairs, higher than long with sloping frons and there-

fore antennae placed on lower half of the head. Eyes large, rounded oval, with vertical long axes, and fully hairy. Jowls narrow, usually narrower than ant_3 , shining, wrinkled, with one row of dark hairs. Vibrissal angle project-

ing. *vi* distinct, dark. Cheeks not visible. Frons somewhat projecting, usually longer than broad, shining with numerous dark *fr*. Frontal triangle of moderate size, behind about 2/3 as broad as frons, with straight side margins reaching from middle to front of frons, shining black, with numerous rather long incurved and recurved *if* in more rows on the surface of the triangle. *oc* indistinctly longer than *if*, recurved, parallel. *pvt* distinct, twice as long as *oc*, upright, convergent. *vii* indistinct, incurved. *vte* somewhat stronger than *pvt*, outcurved. *orb* numerous, 10—15, recurved. Face short and broad with distinct carina, triangular between the antennae, narrow below, reaching epistomal field. Epistomal field broad, brownish, clypeus black. Proboscis normal or sometimes prolonged. Palpi short, cylindrical or somewhat flattened. Antennae small, yellow, more or less darkened. *ant*₂ relatively large. *ant*₃ higher than long, rounded rectangular, pubescent. Arista dark, slender, relatively short, with distinct pubescence.

Thorax black, shining with dark hairs and bristles. Humerus with numerous hairs and 1—2 stronger, hair-like *h*. Mesonotum moderately convex, evenly covered with short dark hairs arising from small more or less star-like granulae, thereby causing rather coarse microsculpture. Thoracic bristles well developed, subequal. 1 *a npl*, 1—2 (-more) *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*. Scutellum rounded, convex or somewhat flattened, short or prolonged, triangular. *ap sc* rather long, arising from distinct, small to long warts. 1-more *la sc*, arising from more or less distinct warts. Pleura shining with coarse, wrinkled microsculpture. *mpl* naked. *stpl* with few dark hairs.

Legs relatively short and stout, simple, black, knees, tibiae, and tarsi more or less yellow. Tibial organ large oval. Femoral organ with numerous warts on a rounded area.

Wings of Oscinellinae-type. Halteres black or yellow.

Abdomen oval, dark brown to black, dusted, with short dark hairs. Female cerci longer or short, ovipositor sometimes laterally compressed. Male cerci basally fused. Surstyli simple. Hypandrium stout. Hypandrial corni not fused but united with the parted ventral epandrial sclerite. Postgonites relatively large and broad. Phallus moderately long.

Distribution: Holarctic, Ethiopian and Oriental Regions.

Material studied: *Calamoncosis minima* (Strobl); *C. aprica* (Meigen, 1830); *C. glyceriae*

Nartshuk, 1958; *C. duinensis* (Strobl, 1909); *C. oscinella* (Becker, 1910); *C. apistylina* Duda, 1935.

Remarks. There has been considerable doubt (Sabrosky 1941) about the true status of *Calamoncosis* Enderlein and whether Enderlein misidentified *Lipara rufitarsis* Loew, 1858. Doskočil and Chvála (1971) studied the types of *rufitarsis* Loew and showed that they undoubtedly belong to *Lipara* Meigen and have the broad facial carina that is characteristic for the genus. If Enderlein really founded *Calamoncosis* on the true *rufitarsis* Loew, *Calamoncosis* will fall as a subjective synonym of *Lipara* Meigen, 1830. However, Enderlein states that *Calamoncosis*, in contrast to *Lipara*, has a very narrow facial carina. Furthermore, Enderlein mentions *Lipara minima* Strobl, 1893, as belonging to *Calamoncosis*. He gives no description, probably due to lack of material, but refers to the unexpectedly small size of the specimens he had identified as *rufitarsis* Loew, from which it seems that they were probably *minima* Strobl. The fact that these specimens were bred from *Lipara*-galls on *Phragmites* provides no decisive information because *minima* Strobl lives as inquiline in *Lipara*-galls. Therefore, for the present, I prefer to use *Calamoncosis* as a valid genus for those species of which *L. minima* Strobl is a typical representative, until a study of Enderlein's material proves the opposite. Whether *Gymnopoda* Macquart, 1835, is identical with *Lipara* Meigen or with *Calamoncosis* Enderlein is also an open question (Sabrosky 1941; Doskočil and Chvála 1971).

Genus *Siphonella* Macquart, 1835: 584

Figs 46, 114 C.

Type species: *Madiza oscinina* Fallén, 1820.

Synonymy: *Madiza* Fallén, 1810: 19, type species: *Madiza oscinina* Fallén, 1820, designation Rondani, 1856, has been used as genus name within *Chloropidae*, synonymous with *Siphonella* Macquart, mostly by some few American authors. On the other hand *Madiza* Fallén, 1810, type species *Madiza glabra* Fallén, 1820, designation Hendel, 1903, has consistently been used as a genus name in *Milichiidae*, subfamily *Madizinae* Czerny, 1909, by European authors. Sabrosky (1973) has applied to the Commission of Zoological Nomenclature to fix, by its plenary power, *Madiza* Fallén, 1810, as a genus within *Milichiidae*; *Eurinella* Meunier, 1893: xciii, type species: *Madiza oscinina* Fallén, 1820; *Syphonella* Perris, 1839: 39 (emendation) (Sabrosky 1941).

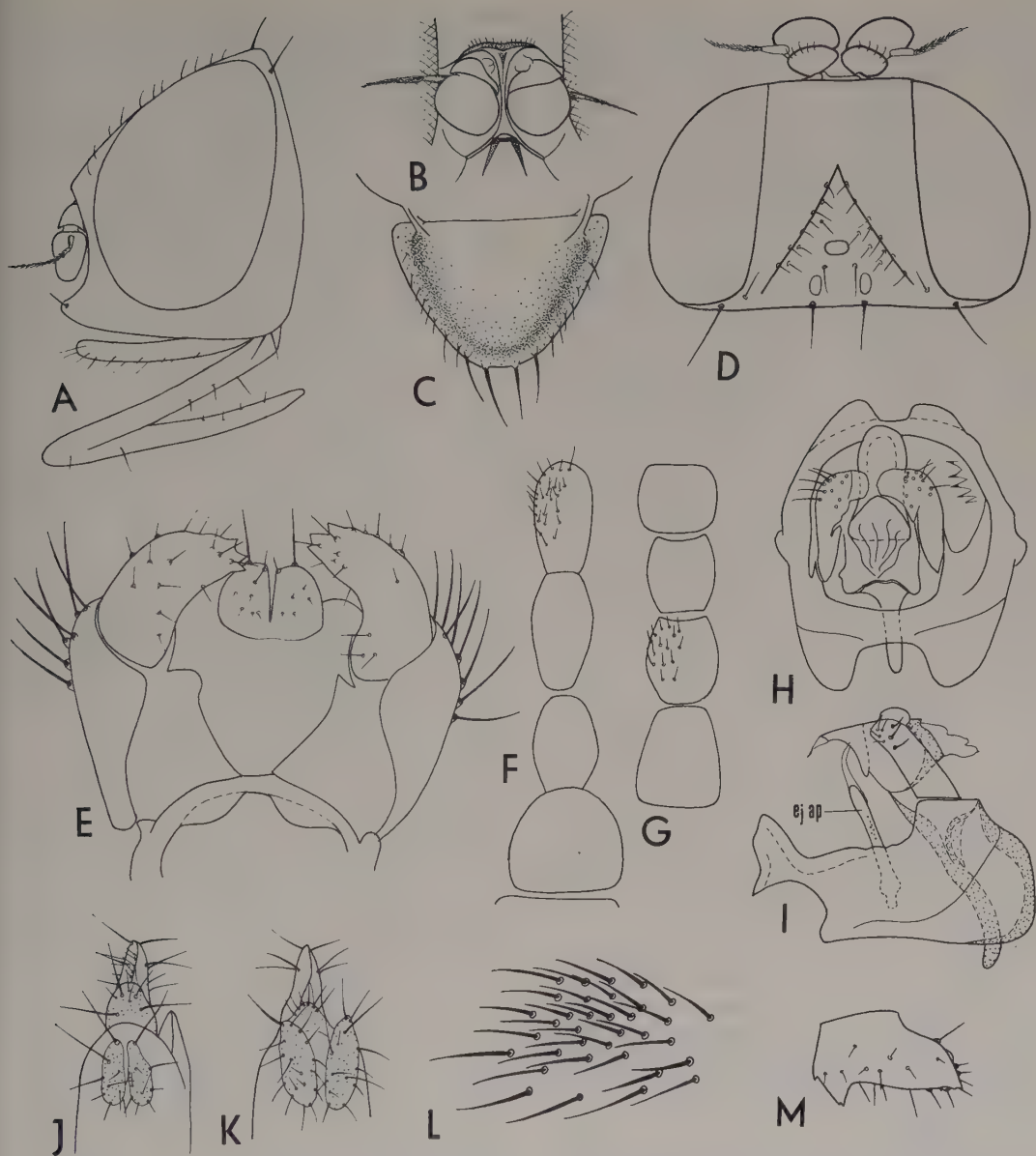


Fig. 46. — A—M. *Siphonella oscinina* (Fallén). — A. Head, lateral view. — B. Face, anterior view. — C. Scutellum, dorsal view. — D. Head, dorsal view. *fr* and *orb* omitted. — E. Epanthrium, ventral view. — F. Female S_1 — S_5 . — G. Male S_2 — S_5 . — H. Phallic complex, ventral view. — I. Phallic complex, lateral view. — J. Apex of ovipositor, dorsal view. — K. Ditto, ventral view. — L. Femoral organ. — M. Right surstylus, outer side.

Medium size, 2—3 mm, black species with hairy eyes and strongly prolonged proboscis with labella as long as t_1 .

Head long as high, distinctly higher behind than in front, black with black hairs and bristles. Eyes large, rounded oval with oblique long axes, densely hairy. Jowls narrower than

ant_3 , dusted with a stripe of hairs below. Vibrissal angle distinctly projecting beyond front of frons. *vi* distinct, short. Cheeks distinct. Frons slightly projecting, longer than broad, dusted with numerous, rather long *fr*. Frontal triangle behind almost as broad as frons, with slightly incurved side margins

reaching middle of frons, shining black, smooth, *if* in few rows on the margin of the triangle, recurved and incurved. *oc* short recurved, convergent. *pvt* about twice as long as *oc*, upright or slightly recurved, convergent. *vti* short, incurved. *vte* long as *pvt*. Face low with distinct high facial carina, narrowly triangular above, thereafter narrowing below and widening again at epistoma. Clypeus narrow, black shining. Proboscis strongly prolonged with labella longer than t_1 . Palpi long, cylindrical, yellowish. Antennae yellow, more or less darkened above. ant_2 short. ant_3 rounded, higher than long, rather thick below, pubescent. Arista short, dark, distinctly pubescent.

Thorax black, shining with dark hairs and bristles. Humerus with numerous hairs, and indistinct *h*. Mesonotum rather convex, evenly covered with numerous short black hairs arising from stellate granulae, causing rather coarse microsculpture. Thoracic bristles distinct, slender. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 small *p pa*, 1 *dc*. Scutellum rather long, rounded triangular, convex, shining, black, with numerous hairs arising from stellate granulae. *ap sc* short, about half as long as scutellum, arising from small warts. 2—3 more distinct *la sc* arising from small warts. Pleura smooth, shining, only *mpl* wrinkled and dusted above. *mpl* without hairs. *stpl* with few hairs.

Legs short and stout, simple, black partly yellowish. Tibial organ distinct, oval. Femoral organ a dense group of long bristles.

Wings of *Oscinella*-type. Halteres brownish to black.

Abdomen oval, black, dusted with dark hairs. Sternites rather broad. Female cerci slender. Surstyli pointed, broad behind with some teeth. Postgonites with apical, medially projecting lobe. Mesolobus deeply cleft.

Distribution: Uncertain; at least present in Holarctic Region.

Material studied: *Siphonella oscinina* (Falén).

Genus *Anomoeoceros* Lamb, 1918: 397

Figs 47, 114 D.

Type species: *Anomoeoceros hispidus* Lamb, 1918.

Small to medium size, 2.5—4 mm, predominantly black, *Calamoncosis*-like species with prolonged scutellum and coarse, granulate microsculpture and white hairs and bristles.

Head black, higher than long with short

jowls, short face, long frons and white hairs and bristles. The antennae are inserted below middle of head. Eyes large, oval to semi-circular, with vertical long axes and dense, long hairs. Jowls narrow, narrower than width of t_1 , dusted, with 1—2 indistinct rows of pale hairs below. *vi* indistinct, pale. Cheeks linear. Frons very slightly projecting, longer than broad, black, not shining, with numerous *fr*. Frontal triangle large, behind as broad as frons, with slightly convex side margins reaching front of frons, shining, coarsely punctate with narrow, smooth median stripe, and covered with numerous white incurved and recurved *if* arising from the punctures. *oc* short as *if*, recurved, convergent. *pvt* strong, at least three times as long as *oc*, straight, upright, somewhat convergent. *vti* indistinct. *vte* somewhat shorter than *pvt*, outcurved. *orb* numerous (more than 10), recurved. Face short, concave. Carina distinct, narrow, rather low. Clypeus broad and slender, black, shining. Proboscis normal. Palpi short, slender, pale. Antennae yellowish, with darkened tip. ant_2 about long as broad. ant_3 longer than broad, oval, with prolonged tip, pubescent. Arista with pale basal segments and short, slender, sparsely pubescent flagellum.

Thorax black with white hairs and bristles. Humerus with numerous hairs and 1 *h*. Mesonotum rather convex, shining, evenly covered with very numerous, pale hairs, arising from distinct granulae, therefore with coarse granulate microsculpture. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 short *p pa*, 1 *dc*. Scutellum longer than broad, very convex, shining with coarse granulate microsculpture, and numerous pale hairs on disc and sides. *ap sc* yellow, half as long as scutellum, arising from distinct warts. About 8 small *ap sc* arising from small warts. Pleura mostly dusted. *mpl* with somewhat wavy sculpture and thick felt-like dust, without hairs. *stpl* partly dusted, largely covered with short pale hairs.

Legs rather short and stout, black with yellow knees and tarsi. Tibial organ distinct. Femoral organ not present.

Wings of *Calamoncosis*-type. Halteres with pale stem and black knob.

Abdomen oval brownish more or less yellowish at base, shining, with pale and dark hairs. Female cerci long. Epandrium short with large cerci, large, flat, apically broader surstyli with long, erect bristles and on either side a ventral epandrial sclerite with two strong bristles. Hypandrium slender, open behind. Postgonites

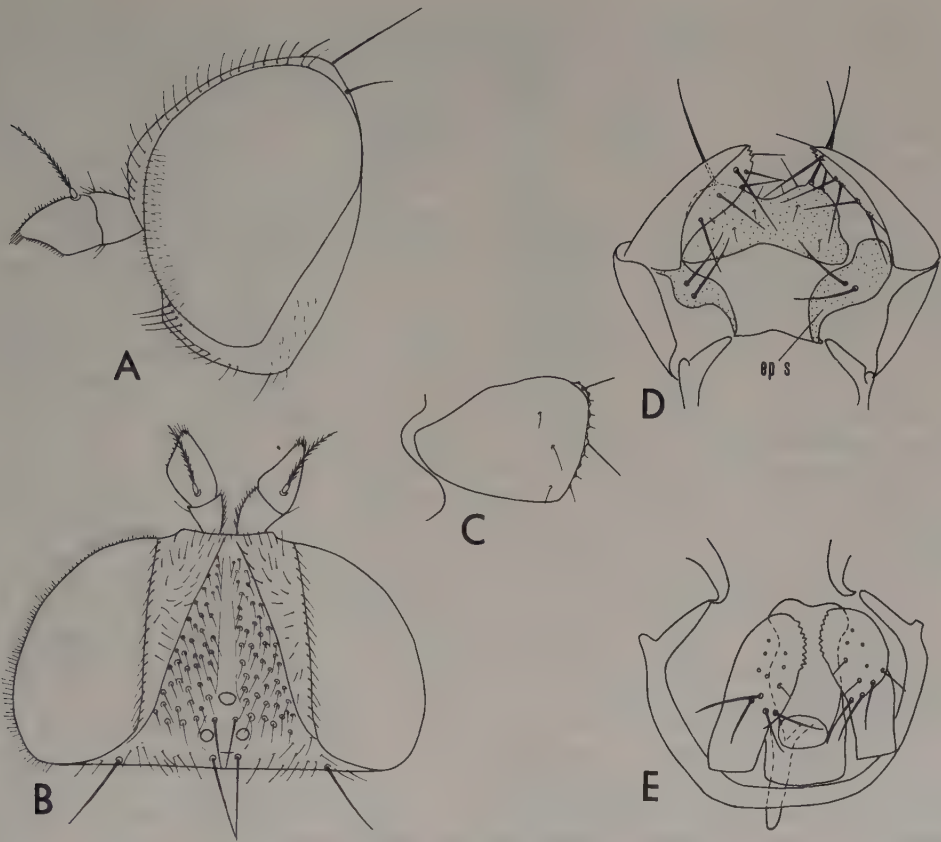


Fig. 47. — A—E. *Anomoeoceros hispidus* Lamb. — A. Head, lateral view. — B. Head, dorsal view. — C. Left surstylus, outer side. — D. Epandrium, ventral view. — E. Phallic complex, ventral view.

large, apically serrate and with four strong bristles.

Distribution: Ethiopian Region.

Material studied: *Anomoeoceros hispidus* Lamb.

The *Polyodaspis* genus group

The *Polyodaspis* genus group is characterized by a stout, shining body, often with coarse microsculpture, stout legs with distinct tibial organ but without femoral organ. The head, especially the frons, has an oily lustre, the jowls and face are yellow with the upper parts of the jowls usually whitish. The facial carina, is triangular above, below narrow, reaching to the middle of the face or the epistoma. The scutellum is large, rounded, or triangular, flat

and usually with numerous scutellars arising from small warts. t_p is strongly oblique.

Polyodaspis Duda has complete or short facial carina, frontal triangle with obvious microsculpture, narrow S_5 and simple f_1 . The head is dorso-ventrally flattened with oval, horizontal eyes.

Epimadiza Becker, 1910, type species: *Oscinis rugosa* de Meijere, 1906, is close to *Polyodaspis* and differs mainly in having thickened f_1 with strong spines below (fig. 50 J).

Fiebrigella Duda as represented by *F. palposa* (Fall.) is not very different from any of the African and Oriental *Polyodaspis* species I have seen. However, *Fiebrigella* has a higher and shorter head, with rounder eyes with more vertical long axes and more numerous hairs on the jowls, which hairs are arising from larger punctures. The male S_5 is broad.

Fiebrigella also resembles *Lasiambia* Ender-

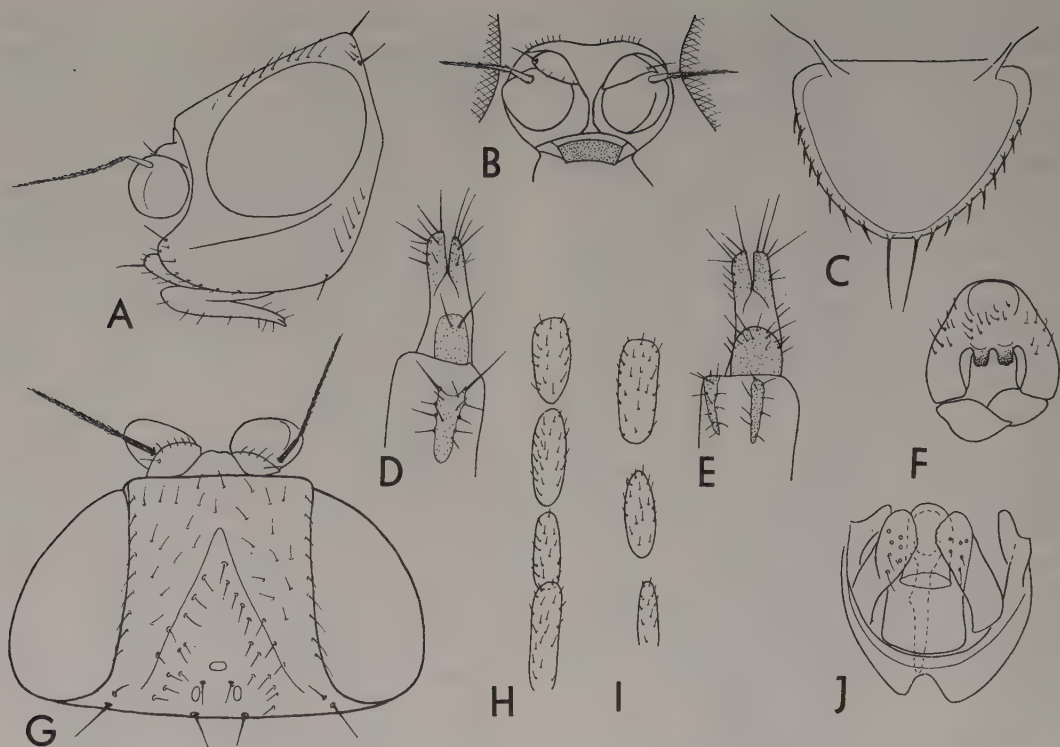


Fig. 48. — A—J. *Polyodaspis ruficornis* (Macquart). — A. Head, lateral view. — B. Face, anterior view. — C. Scutellum, dorsal view. — D. Apex of ovipositor, dorsal view. — E. Ditto, ventral view. — F. Epandrium, posterior view. — G. Head, dorsal view. — H. Male S_2 — S_5 . — I. Female S_3 — S_5 . — J. Phallic complex, ventral view.

lein. Like *Fiebrigella Lasiambia* has a broad S_5 in the male but its head is still shorter and higher, without visible cheeks and with still more rounded eyes with vertical long axes.

These four genera certainly form a monophyletic group but the decision about their validity as separate genera must be based on a larger material.

Genus *Polyodaspis* Duda, 1933: 224

Figs 48, 114 E.

Type species: Siphonella ruficornis Macquart, 1835.

Synonymy: Macrothorax Lioy, 1864: 1126, type species: *Siphonella ruficornis* Macquart, 1835 (preoccupied, Sabrosky 1941).

Small to medium size, 2—3 mm, black species with well-developed facial carina, strongly projecting vibrissal angle, shining frons and large, rounded, flat scutellum with numerous, 6—12, short, stout *la sc* arising from small warts.

Head longer than high, black, more or less

yellow in front, with short yellow to black hairs and bristles. Eyes oval with horizontal or oblique long axes, naked or with very sparse short hairs. Jowls rather broad, broader than ant_3 , by an oblique carina divided into a lower posterior darker area with coarse microsculpture and numerous hairs, and an upper anterior, smooth, area without hairs and covered with more or less silvery white dust. Vibrissal angle strongly projecting. *vi* distinct, short. Cheeks distinct. Frons somewhat projecting longer than broad, shining, with few or numerous *fr*. Frontal triangle of medium size, behind about 1/2 as broad as frons, with straight side margins reaching 1/2—2/3 length of frons, black, shining, with more or less distinct striate or reticulate microsculpture. *if* short, in one or more rows on the surface of the triangle, recurved and incurved. *oc* short, recurved, convergent. Vertical bristles distinctly longer than *oc*, but rather short and stout. *pvt* upright, convergent. *vti* incurved. *vte* outcurved. *orb*, 8—10, short, recurved. Face yellow or white, short. Facial carina, well developed,

usually complete, triangular in upper half, below thin to very thin, membraneous, separating the deep antennal foveae. Clypeus black, shining. Proboscis usually distinctly prolonged but labella much shorter than t_1 . Palpi short or longer, rather stout, yellow. Antennae yellow, more or less darkened above. ant_2 short. ant_3 rounded, with somewhat projecting upper corner, broader than long, basally very thick, more or less onion-like, with short pubescence.

Thorax shining black with yellow to black hairs and bristles. Thoracal bristles distinct. Humerus with numerous hairs, with or without distinct *h*. Mesonotum moderately convex or somewhat flattened, evenly covered with very numerous short hairs arising from small granulae, thus causing coarse microsculpture. *1 a npl*, *1—2 p npl*, *1 a pa*, *1 smaller p pa*, *1 dc*. Scutellum rather large, rounded, flattened, shining, black, covered with numerous hairs arising from small granulae. *ap sc* of medium size, rather close together, arising from small warts. Usually numerous, 6—12, short, stout, subequal *la sc* arising from small warts. Pleura not dusted often with coarse microsculpture at least on *mpl*, usually also on *stpl* and in some species on all pleura. *mpl* without hairs. *stpl* with few hairs.

Legs short, rather stout, black, partly yellow. Tibial organ small, oval. Femural organ not present.

Wings short and broad, with r_{2+3} , r_{4+5} and m_{1+2} more or less procurved. First basal cell often broadened at middle. t_p strongly oblique. Halteres black or yellow.

Abdomen short, oval, black, dusted with rather long pale or dark hairs. Sternites long and narrow. Female cerci slender. Male cerci squarish. Surstylus thickened.

Distribution: Palaearctic, Ethiopian and Oriental Regions.

Material studied: *Polyodaspis ruficornis* (Macquart); *Polyodaspis spp.* (Sri Lanka, South Africa).

Genus *Fiebrigella* Duda, 1921: 143

Figs 49, 114 F.

Type species: *Fiebrigella verrucosa* Duda, 1921.

Synonymy: *Goniopsis* Duda 1929: 166, type species:

Fiebrigella boliviensis Sabrosky, 1970, as *Goniopsis verrucosa* Duda, 1929, nec Duda, 1921; *Goniopsita* Duda, 1930: 69, type species: *Fiebrigella boliviensis* Sabrosky, 1970, as *Goniopsita verrucosa* Duda, 1930, nec Duda, 1921 (Sabrosky 1941, 1970).

Medium size, 2.5—3 (—4) mm, shining black species with shining frons and partly silvery dust on jowls.

Head higher than long, shining, black, with partly yellowish jowls, face and frons. Eyes rounded oval with horizontal or somewhat oblique long axes, with sparse, short hairs. Jowls broad, at least as ant_3 , dusted with pale, more or less silvery dust above, in lower half shining with numerous dark hairs arising from large punctures. *vi* distinct, dark. Vibrissal angle distinctly projecting. Cheeks distinct. Frons somewhat projecting, longer than broad, greasy shining with numerous dark *fr*. Frontal triangle rather small, behind broad as half width of frons with straight side margins reaching about middle of frons, smooth, shining, black. *if* in one row on the margin of the triangle, incurved. *oc* short, recurved, parallel. Vertical bristles stronger than *oc*, subequal. *pvt* recurved, parallel. *vti* somewhat smaller, incurved. *vte* outcurved. *orb* about 8, recurved. Face concave, almost whitish. Facial carina distinct, triangular between the antennae, than narrow and fading away at middle of face. Clypeus black, shining. Proboscis short. Palpi rather stout, flattened, yellowish. Antennae yellow, more or less darkened. ant_2 short. ant_3 rounded, higher than long, with very short pubescence. Arista with basal segments naked, flagellum very slender, with extremely short pubescence.

Thorax shining black with distinct black hairs and bristles. Humerus with hairs and 1 distinct *h*. Mesonotum moderately convex, somewhat flattened behind, with broad, shallow, behind united depressions along *dc* lines, evenly covered with numerous short hairs, arising from small warts causing a distinct microsculpture. Thoracic bristles rather stout. *1 a npl*, *1 p npl*, *1 a pa*, *1 small p pa*, *1 dc*. Scutellum rounded flattened, shining, hairy with coarse microsculpture. *ap sc* not quite as long as scutellum, 1—3 indistinct *la sc*. Pleura smooth, shining. *mpl* not hairy. *stpl* with very few hairs.

Legs simple, black, more or less yellowish. Tibial organ oval. Femural organ not present.

Wings of Oscinellinae-type with rather coarse veins. Halteres yellow or brownish.

Abdomen oval, black, thinly dusted above, subshining, with short dark hairs. Sternites rather broad. Female cerci long and slender. Surstyli large, broad, ovate. Male cerci basally fused. Hypandrium not closed behind. Phallus short.

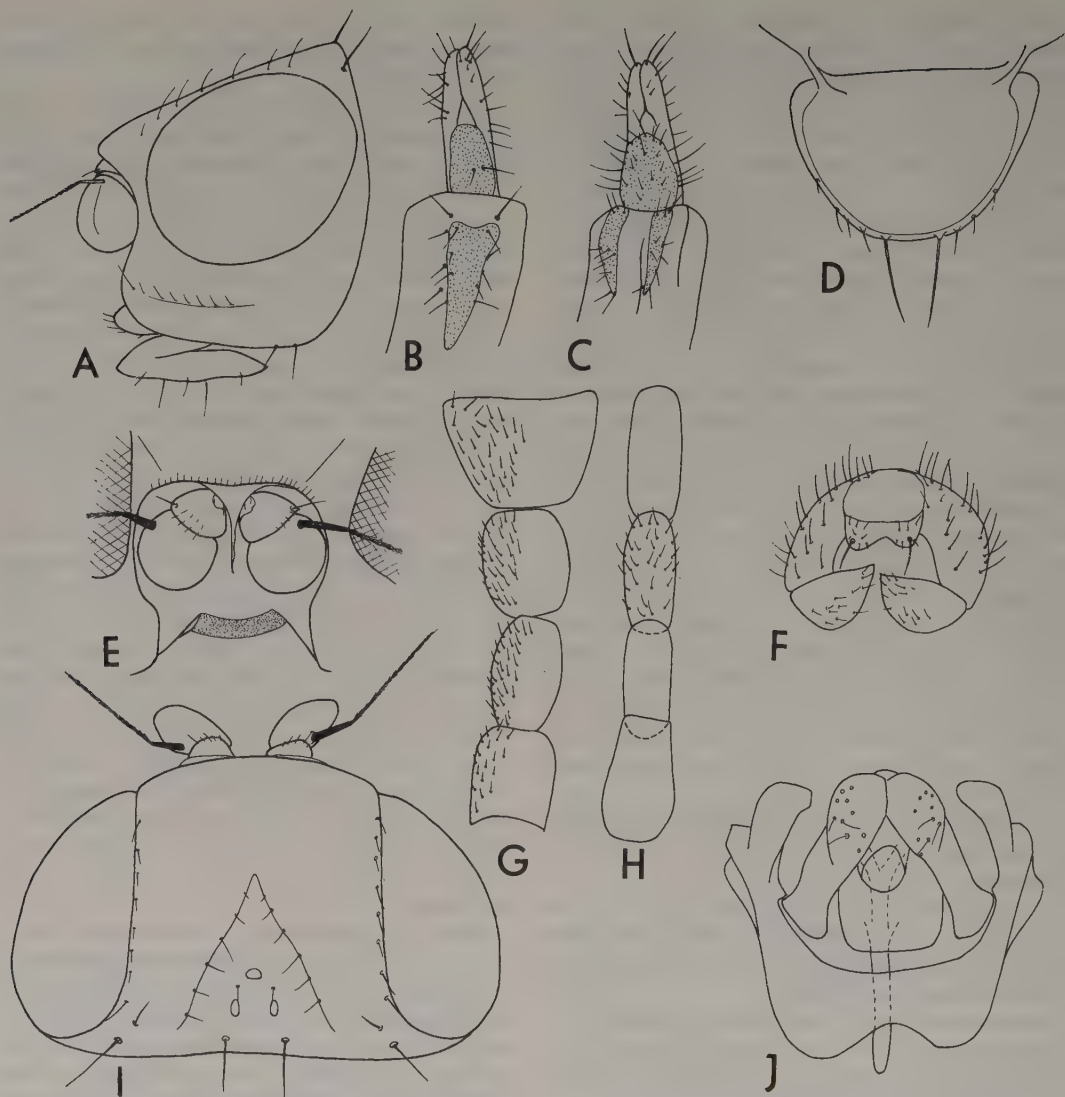


Fig. 49. — A—J. *Fiebrigella palposa* (Fallén). — A. Head, lateral view. — B. Apex of ovipositor, dorsal view. — C. Ditto, ventral view. — D. Scutellum, dorsal view. — E. Face, anterior view. — F. Epandrium, posterior view. — G. Male S_2 — S_5 , bristles partly omitted. — H. Female S_2 — S_5 , bristles partly omitted. — I. Head, dorsal view. *fr* omitted. — J. Phallic complex, ventral view.

Distribution: Recorded from all regions, except the Australian.

Material studied: *Fiebrigella palposa* (Fallén).

Genus *Lasiambia* Enderlein, 1936: 188

Figs 50, 114 G.

Type species: *Oscinella fycoperda* Becker, 1910 (designation Sabrosky 1941).

Small, 1.5—2.5 mm, shining black *Fiebrigella*-like species with partly pale, almost white jowls, face and antennae.

Head higher than long, black, partly yellowish, with dark bristles. Eyes large, rounded with vertical long axes, naked. Jowls narrow, narrower than ant_3 , shining, black with one row of dark hairs below, yellow with silvery white dusting in upper anterior part. Vibrissal angle

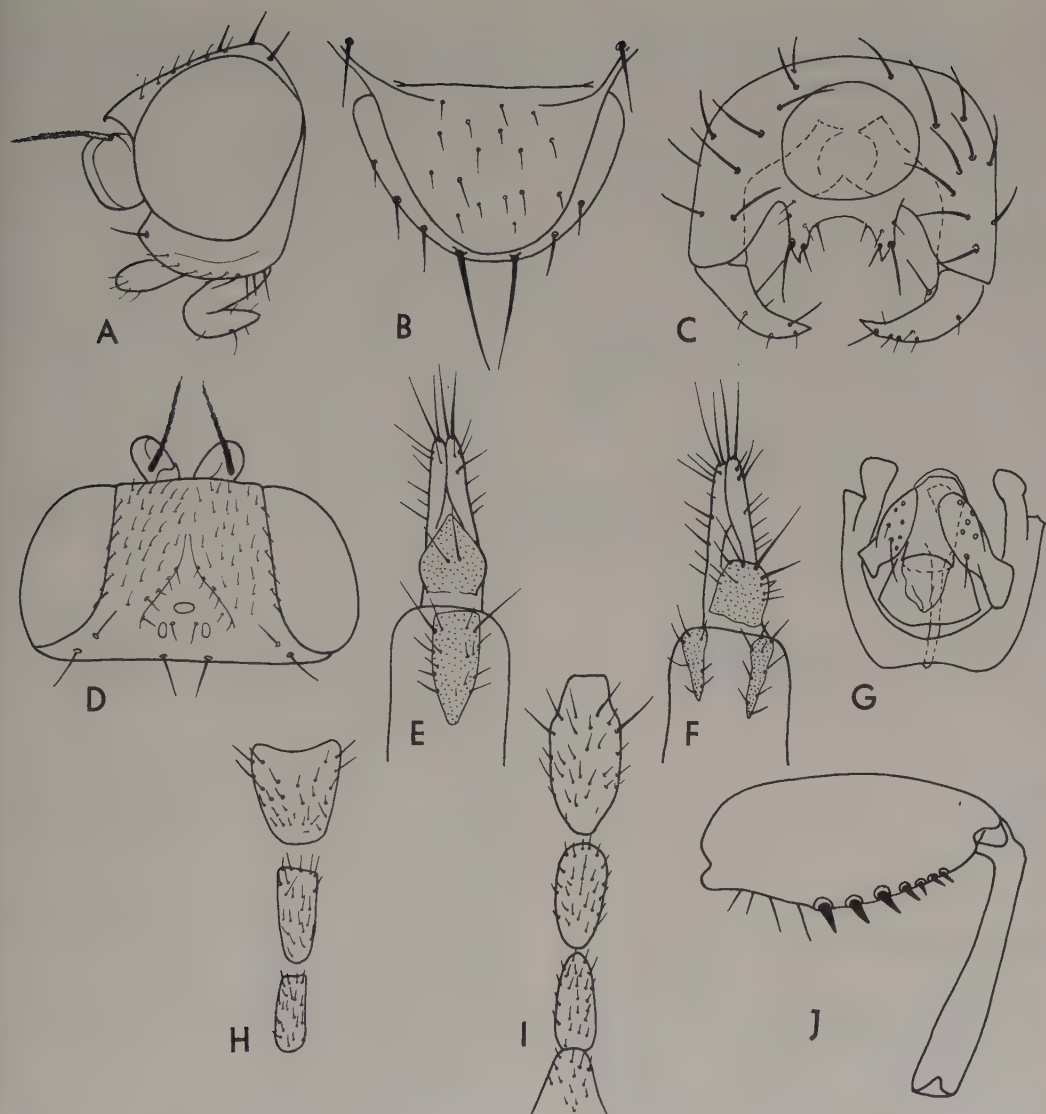


Fig. 50. — A—I. *Lasiambia brevibucca* (Duda). — A. Head, lateral view. — B. Scutellum, dorsal view. — C. Epandrium, posterior view. — D. Head, dorsal view. — E. Apex of ovipositor, dorsal view. — F. Ditto, ventral view. — G. Phallic complex, ventral view. — H. Male S_3 — S_5 . — I. Female S_2 — S_5 . — J. *Epimadiza pertubans* (Becker), f_1 and t_1 .

somewhat projecting. *vi* distinct, pale. Cheeks not visible. Frons somewhat projecting, greasy shining, black with numerous *fr*, as broad as long. Frontal triangle small, behind less broad than half width of frons, with somewhat incurved side margins reaching about middle of frons, shining, black, smooth or with very indistinct reticulate microsculpture. *if* in one row along the margin of the triangle, incurved.

oc short, recurved, parallel to convergent. Vertical bristles distinctly stronger than *oc*, subequal. *pvt* recurved, parallel or convergent. *vti* incurved. *vte* outcurved. 5—6 recurved *orb*. Face concave, white, between antennae with a very small triangular carina. Clypeus broad, black, shining. Proboscis short. Palpi rather stout, white, with dark hairs. Antennae white or yellow, more or less darkened above. *ant*₂

short. ant₃ rounded, higher than long with short pubescence. Arista dark, slender, with extremely short pubescence.

Thorax shining black with black hairs and bristles. Humerus with few hairs and distinct *h*. Mesonotum moderately convex with shallow depression along *dc* lines, and evenly dispersed, numerous, very short hairs, arising from very minute stellate granulae causing faint micro-sculpture. Thoracal bristles distinct, subequal. 1 *a npl*, 1 strong and 1 very small *p npl*, 1 *a pa*, 1 small *p pa*, 1 *dc*. Scutellum rounded, somewhat flattened, dusted, with some hairs arising from small granulae. *ap sc* about as long as scutellum. 1—2 short *la sc*. Pleura smooth, shining black. *mpl* without hairs. *stpl* with few dark hairs.

Legs slender, simple, black, more or less yellow. Tibial organ narrow, oval. Femural organ not present.

Wings of *Fiebrigella*-type. *t_p* hardly oblique. Halteres yellow.

Abdomen oval, black thinly dusted, subshining, with dark hairs. *S₅* rather broad. Female cerci long and slender. Surstyli pointed. Hypandrium not fused behind.

Distribution: Uncertain; present at least in Palaearctic.

Material studied: *Lasiambia brevibucca* (Duda, 1933).

The *Aphanotrigonum* genus group

Like the members of the *Lipara* and *Polyodaspis* genus groups the members of the *Aphanotrigonum* genus group have recurved, cruciate or parallel *oc* and a more or less complete facial carina. Like most members of the *Polyodaspis* group they have a projecting vibrissal angle but in contrast usually an extensively dusted body and well-developed femural organ. Some of the entities here treated as genera for instance *Aphanotrigonum* and *Tricimba* are rather heterogeneous and will perhaps in future need subdivision.

The genus *Aprometopis* Becker is remarkable not only by its pale yellowish cuticle but also by the broad facial carina and the very deep antennal foveae, the large cercal complex and the femural organ composed by a large number of large, oval warts. The phallic complex is of ordinary Oscinellini-type.

Aphanotrigonella Nartshuk is close to *Aprometopis*. The facial carina is rather broad, complete, the antennal foveae deep, the cerci

fused and the mesonotum has similar grooves along *acr* and *dc* lines. The differences are: a heavily dusted grey body, long postgonites and long, narrow distiphallus and absence of femural organ in *Aphanotrigonella*. The reasons why I treat the latter taxon as a genus and not as a subgenus of *Aphanotrigonum* are the differences in shape of facial carina, antennal foveae, mesonotum, postgonites, phallus and femural organ.

Siphunculina Rondani is sometimes placed close to *Fiebrigella* (*Goniopsita*) (cf. Collin 1946) which could be defensible on account of its lack of femural organ and the mostly shining black colour. *Siphunculina* has a complete facial carina, a very broad cercal complex, a rounded, convex scutellum usually with short bristles, but above all, the *r₂₊₃* is exceptionally short. However, there are also more extensively dusted species.

Aphanotrigonum Duda has a less well-developed facial carina and only shallow antennal foveae. The body is heavily dusted, the the mesonotum and scutellum flat, often with the *ap sc* considerably distant from each other (fig. 52 G), the cerci not basally fused, short, normal postgonites and pregonites and a femural organ consisting of two rows of warts. The species nowadays usually attributed to *Aphanotrigonum* have often fairly different male genitalia. The cerci, surstyli, and phallus can be of more or less complex structure. For instance *A. meijerei* Duda with convex scutellum, bifid claws and rather long postgonites (fig. 52 I—K) should perhaps be grouped separately from *A. trilineatum* Meig. and its allies. There are a number of Palaearctic and Ethiopian species which have to be revised at the same time as *meijerei*.

The genus *Tricimba* Lioy also presents a complex situation. The type species *T. lineella* (Fall.) has a very narrow facial carina only reaching middle of face, 1 *p npl*, very distinct, granulate grooves along *acr* and *dc* lines, thick scutellum with short, stout scutellars arising from distinct warts, fused cerci and no femural organ. Other members of the genus, *T. cincta* Meig. and its allies, have a more well-developed facial carina, 2 *p npl*, less distinct mesonotal grooves, thin, flat scutellum with normal bristles in normal position, free cerci and femural organ composed of two rows of warts. *Echimba* Duda and probably *Crassivenula* Sabrosky also belong to this genus complex characterized primarily by the distinct mesonotal grooves.

Trachysiphonella Enderlein has a well-devel-

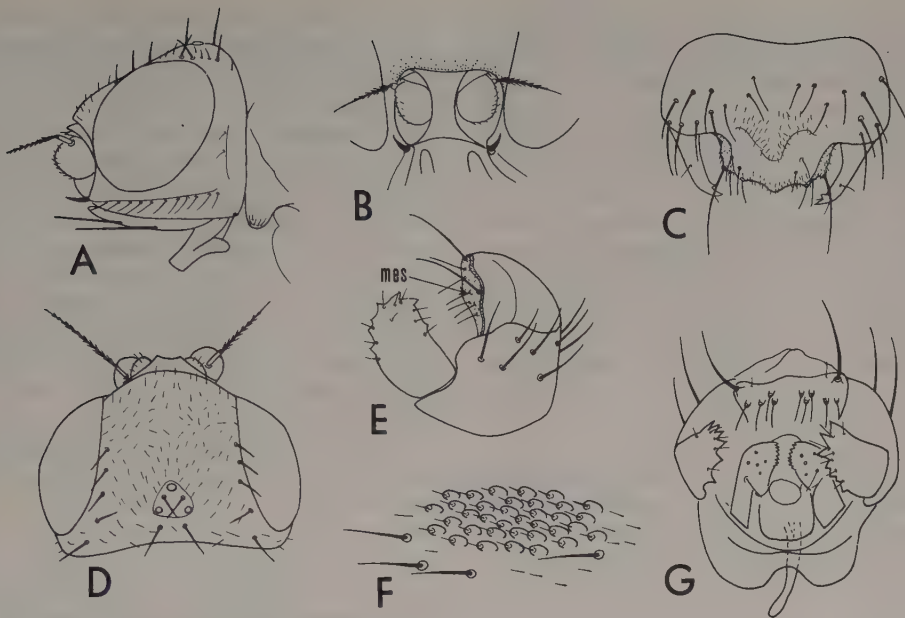


Fig. 51. — A.G. *Aprometopis flavofacies* Becker. — A. Head, lateral view. — B. Face, anterior view. — C. Epandrium, posterior view. — D. Head, dorsal view. — E. Epandrium, postero-lateral view. — F. Femural organ. — G. Male genitalia, ventral view.

oped facial carina, not fused cerci and an oval femural organ. The body colour is yellow with dark spots, the frontal triangle is very small and the postgonites have heavier sclerotized margins and corners. The proboscis is short or distinctly prolonged.

Oscinimorpha Lioy has well-developed facial carina and prolonged proboscis. It differs from *Trachysiphonella* in having black thorax, larger frontal triangle, postgonites of normal Oscinellini-type and femural organ composed of one row of warts. The pleura are usually extensively shining. Forms with broader facial carina and extensively dusted pleura such as *Oscinimorpha albisetosa* Duda, 1932, would possibly merit to be placed in a separate subgenus.

Conioscinella Duda is close to *Oscinimorpha* but differs in having less well-developed facial carina, less projecting vibrissal angle and short proboscis. It has dusted frontal triangle, hairy eyes and evenly dispersed hairs on mesonotum and links this genus group with the following.

Genus *Aprometopis* Becker, 1910: 438

Figs 51, 114 H.

Type species: *Aprometopis flavofacies* Becker, 1910.

Small, 2.5—3 mm, yellow, slender species with very long and flat head and yellow bristles.

Head longer than high, dusted, yellow with short, pale hairs and bristles. Eyes oval, with oblique long axes and sparse short pubescence. Jowls broad as ant₃, distinctly broader behind, with short hairs in lower part. *vi* distinct, short. Vibrissal angle projecting. Cheeks linear. Frons projecting, longer than broad, narrower in front, without distinct frontal triangle, dusted and covered with numerous small *fr. oc* very short, shorter than ocellar tubercle, recurved, convergent. *pvi* somewhat stronger, upright, divergent. *vii* indistinct. *vte* shorter than *pvi*, outcurved. About 6 (3 distinct), recurved *orb*. Lower part of posterior side of head swollen, flat, sliding against the enlarged *prpl*. Face small, short and narrow. Facial carina high and broad, forming two very deep, rounded grooves, almost enclosing the small, spherical, yellow antennae. ant₂ short. ant₃ higher than long. Arista brownish with sparse pubescence. Clypeus yellow. Proboscis extremely short. Palpi slender with two very long, straight, forward-directed bristles.

Thorax long, narrow, yellow, dusted, with black markings and distinct bristles. Humerus without spot, with few hairs and 1 *h*. Meso-notum somewhat flattened with narrow grooves

along *acr* and *dc* lines, one double black central stripe and one black stripe outside *dc* line, smooth, covered with short pale hairs, partly arranged in lines. 1 *a npl*, 1 *p npl*, 1 *a pa*, 1 very small *p pa*, 1 *dc*. Scutellum rounded, flattened, dusted, with pale hairs. *ap sc* half length of scutellum, arising from small warts. 2 *la sc* arising from small, short warts. Pleura smooth, dusted, yellow, without hairs. *stpl* with rounded black spot. Metanotum black shining.

Legs slender, simple, yellow. Tibial organ small oval. Femural organ with numerous, relatively large, oval warts with short, slender bristles.

Wings rather long of Oscinellinae-type. Halteres yellow.

Abdomen yellow, dusted with pale hairs. Epandrium with broad, serrate surstyli and cerci fused into a broad rectangular sclerite. Postgonites serrate, short, and broad. Hypandrium not closed behind. Phallus short.

Distribution: Africa.

Material studied: *Aprometopis flavofacies* Becker.

Genus *Aphanotrigonella* Nartshuk, 1964: 309

Figs 52, 114 I.

Type species: *Aphanotrigonum* (*Aphanotrigonella*) *longinerve* Nartshuk, 1964.

Small, 1—2 mm, heavily dusted grey species with yellow face, large facial carina, and short white hairs and bristles.

Head as long as high, black, with anterior 3/4 of jowls, frons and face yellow, heavily dusted, with very short white hairs and bristles. Eyes rounded oval with oblique long axes, naked. Jowls about as broad as *ant*₃, dusted, with some short hairs below. *vi* distinct but short. Vibrissal angle distinctly projecting. Cheeks distinct. Frons somewhat projecting, longer than broad, dusted with numerous short *fr*. Frontal triangle behind about 2/3 as broad as frons, with indistinct margins reaching middle of frons, smooth, black, heavily dusted in grey. *if* few, short, on the margin of the triangle, incurved. *oc* recurved, convergent. *pvt* upright, convergent, *vii* and *vte* indistinct. *orb* about 6 in number, recurved. Face with distinct, complete, rather broad carina separating the deep antennal foveae. Clypeus dark, shining. Proboscis well developed. Palpi long, cylindrical yellow. Antennae yellow. *ant*₂ short. *ant*₃ rounded, higher than long, thick, below

more or less onion-shaped, with short pubescence. Arista yellow with short pubescence.

Thorax black, completely covered with very thick, pale grey dust. Bristles and hairs short white. Humerus with hairs and 1 *h*. Mesonotum moderately convex, smooth, with narrow row but distinct grooves along *acr* and *dc* lines with sparse short hairs. The hairs along *acr* and *dc* lines in distinct rows, partly parted. 1 *a npl*, 1 *p npl*, 1 *a pa*, *p pa* indistinct, 1 *dc*. Scutellum short, squarish, flattened, smooth, dusted, with few hairs on the disc. *ap sc* short widely separated. *la sc* indistinct. Pleura completely dusted, smooth, without hairs, only subspiracular callus shining.

Legs slender, simple, yellow, partly darkened. Tibial organ small, oval. Femural organ not present.

Wings whitish with pale veins. *t*_a and *t*_p rather close together, distance between them the same as length of *t*_p. *r*₄₊₅ and *m*₁₊₂ not quite parallel. They are convergent for a short distance not far in front of apex of the wing. *t*_p oblique. Halteres yellow.

Abdomen black with thick, grey, dust, and short pale hairs. Female cerci slender. Epandrium with projecting antero-lateral corners (surstyli according to Nartshuk). Male cerci fused forming a bilobed mesolobus. Surstyli small. Distiphallus long and slender. Hypandrial arms very broad. Hypandrium not closed behind. Gonites long without distinct limits between postgonites and pregonites. Dorsal pregenital sclerite large. Ventrally and anteriorly of hypandrium two large, conical vesicae (fig. 52 E, v).

Distribution: Central Asia.

Material studied: *Aphanotrigonella longinerve* (Nartshuk, 1964) n. comb.

Genus *Siphunculina* Rondani, 1856: 128

Figs 53, 114 J.

Type species: *Oscinis ornatifrons* Loew, 1858 (as *Siphunculina brevinervis* Rondani, 1856) (Sabrosky 1941).

Synonymy: *Microneurum* Becker, 1903: 152, type species: *Oscinis ornatifrons* Loew, 1858 (as *Microneurum maculifrons* Becker, 1903) (Sabrosky 1941).

Subgenus *Siphunculina* Rondani, 1856

Small, 1.5—2.5 mm, black species with large shining frontal triangle and unusually short *r*₂₊₃.

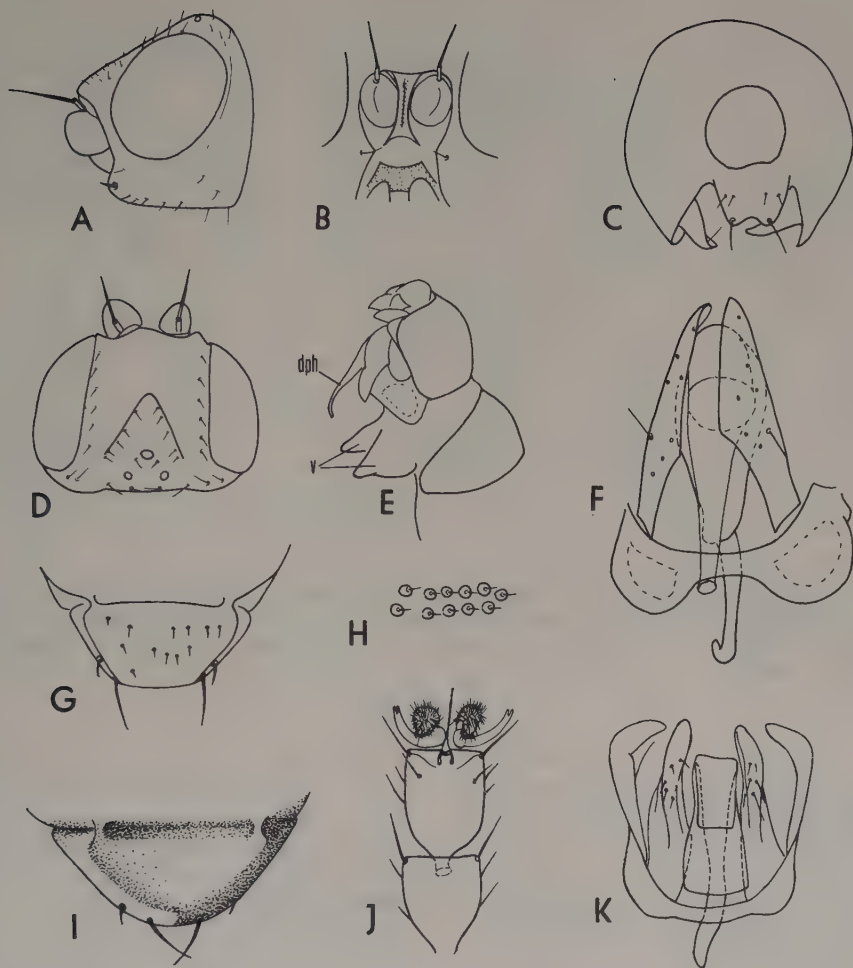


Fig. 52. — A—F. *Aphanotrigenella longinerve* (Nartshuk). — A. Head, lateral view. — B. Face, anterior view. — C. Epandrium, posterior view. — D. Head, dorsal view. — E. Apical end of male abdomen, ventro-lateral view. v = abdominal vesica. — F. Phallic complex, ventral view. — G. *Aphanotrigonum fasciellum* (Zetterstedt), scutellum, dorsal view. — H. *Aphanotrigonum trilineatum* (Meigen), femural organ. — I—K. *Aphanotrigonum meijerei* Duda. — I. Scutellum, dorsal view. — J. Apical segments of fore tarsus. — K. Phallic complex, ventral view.

Head higher than long, black, with very short hairs and bristles. Eyes rounded with somewhat oblique long axes, naked. Jowls narrower or broader, width subequal to height of ant₃. Vibrissal angle projecting beyond front of frons. vi short. Cheeks linear or invisible in side view. Frons somewhat projecting, as broad as long, with dark or white dust, often with shining spots around the fr. fr few. Frontal triangle large, behind almost as broad as frons with somewhat convex side margins reaching

front of frons, smooth, with shallow, longitudinal central groove or oval depression in front, shining black. if in one row on the margin of the triangle, incurved. oc and vertical bristles very short, subequal. oc recurved, convergent. pvt upright, convergent. vti incurved. vite outcurved. 5—7 short, recurved orb. Face with large facial carina, which is broadly triangular between the antennae, thereafter narrowing and again broadening and reaching epistoma, thus forming two deep antennal

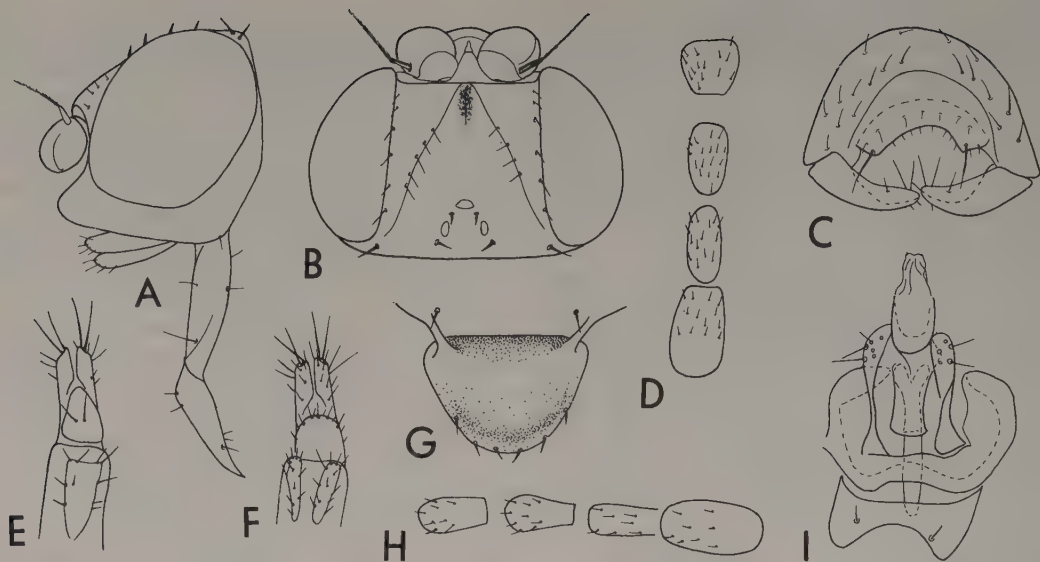


Fig. 53. A—I. *Siphunculina aenea* (Macquart). — A. Head, lateral view. — B. Head, dorsal view. — C. Epandrium, posterior view. — D. Male S_2-S_5 . — E. Apex of ovipositor, dorsal view. — F. Ditto, ventral view. — G. Scutellum, dorsal view. — H. Female S_2-S_5 . — I. Phallic complex.

fovae. Clypeus large, black, shining. Proboscis rather long with somewhat prolonged labella. Palpi long, cylindrical, yellow. Antennae yellow, more or less darkened, small, ant_2 well developed, ant_3 rounded, higher than long, very thick basally, onion-like, shortly pubescent. Arista slender, basally pale, naked, towards tip dark with short pubescence.

Thorax black, with yellowish to black short hairs and bristles. Humerus shining with few hairs and indistinct *h*. Mesonotum moderately convex with very indistinct depressions along *dc* lines, shining or with a reticulate pattern of white dust, and numerous very short, usually pale hairs that are not quite evenly dispersed but arranged in indistinct lines along *acr* and *dc* lines, not distinctly parted. The hairs arise from small stars causing rather indistinct microsculpture. Thoracic bristles very short but stout. 1 *a npl*, 1 distinct and 1—2 indistinct *p npl*, 1 *a pa*, *p pa* indistinct, 1 *dc*. Scutellum rounded, often rather short, convex, dusted, with some short hairs above. Scutellars very short, situated rather distinctly below, usually arising from very small warts. 1 *ap sc*, 2—4 *la sc*. Pleura shining with some dusted spots, partly with uneven surface. *mpl* without or with a few hairs. *stpl* with few short hairs.

Legs short, simple, black, tibiae and tarsi

more or less yellow. Tibial organ oval. Femoral organ absent.

Wings whitish with pale veins. First basal cell very short and broad. r_{2+3} very short therefore $mg_1:mg_2:mg_3=1:1:2$. t_p often distinctly oblique. Halteres black.

Abdomen oval, black, thinly dusted with pale and dark hairs.

Material studied: *Siphunculina ornatifrons* (Loew); *S. aenea* (Macquart, 1835); *S. signatum* (Wollaston, 1858).

Subgenus **Liomicroneurum** Enderlein, 1911: 230

Type species: *Siphonella funicola* de Meijere, 1905.
Synonymy: *Liriomicroneurum* Duda 1933: 97.

This species is undoubtedly closely related to the *Siphunculina* species treated above. The difference is that the hairs and bristles are generally longer, "normal" and that the hairs on mesonotum are evenly dispersed, not in distinct rows. In the structure of the head, wings, scutellum, etc. it agrees with *Siphunculina* s. str. Sabrosky (1941) is prepared to give it at most subgeneric status, which seems correct.

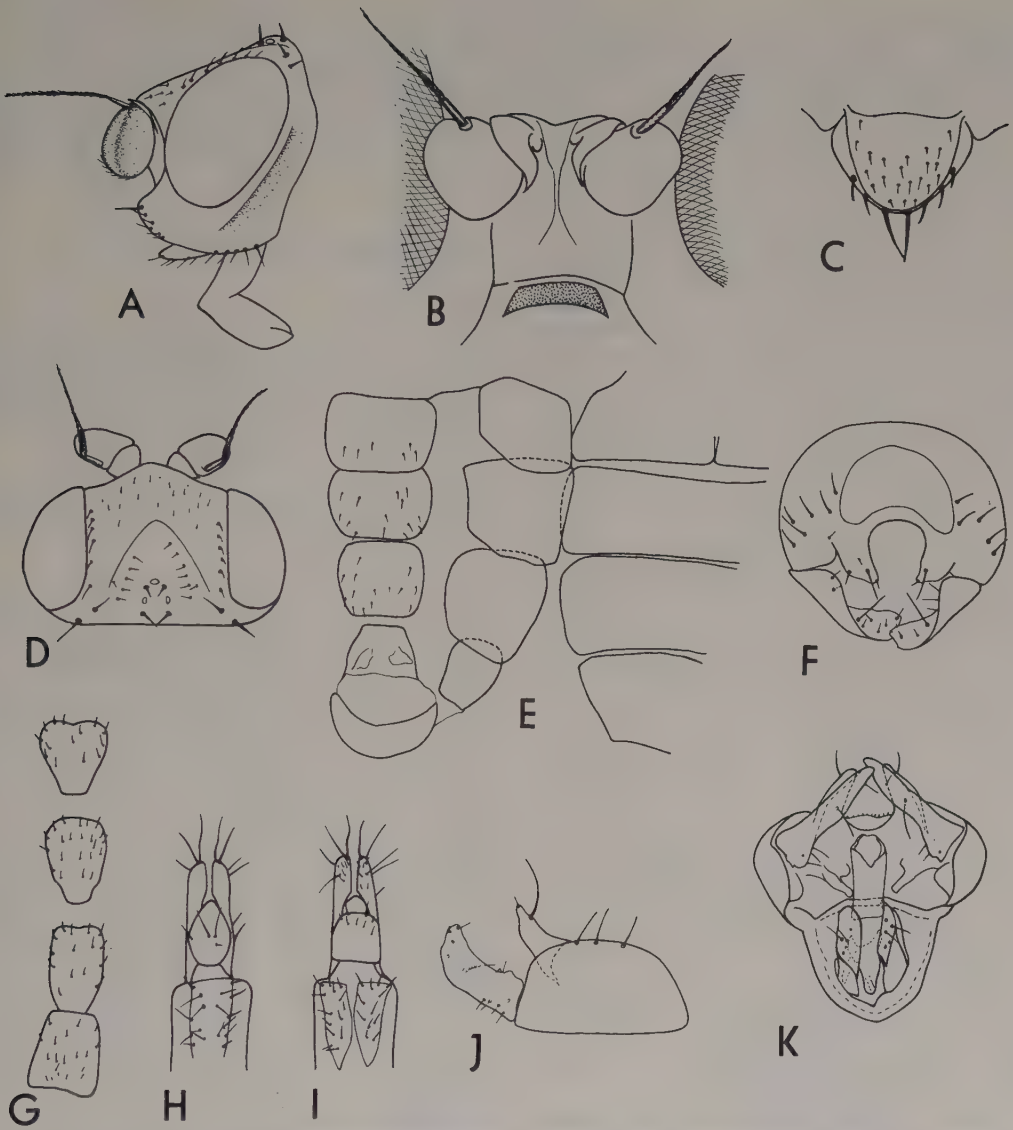


Fig. 54. — A—K. *Aphanotrigonum trilineatum* (Meigen). — A. Head, lateral view. — B. Face, facial carina, antennae, clypeus, anterior view. — C. Scutellum, dorsal view. — D. Head, dorsal view. — E. Male abdomen: S_4 — S_5 , S_{7+8} , and T_{1+2} — T_5 , the latter divided along the secondary, lateral line of desclerotization. — F. Epandrium, posterior view. — G. Female sternites S_2 — S_5 . — H. Apical end of ovipositor, dorsal view. — I. Ditto, ventral view. — J. Epandrium, lateral view. — K. Male genitalia, ventral view.

Genus *Aphanotrigonum* Duda, 1932: 35

Figs 54, 115 A.

Type species: *Chlorops trilineata* Meigen, 1830.

Small, 1.5—2 mm, predominantly black, heavily dusted species with yellow frons and flattened scutellum.

Head higher than long, black, jowls, face

and frons partly yellow, dusted with short, stout bristles. Eyes oval with oblique long axes, distinctly hairy. Jowls at most broad as ant_3 , with numerous pale or dark hairs in posterior and lower part. *vi* distinct. Vibrissal angle distinctly projecting. Cheeks invisible or linear. Frons somewhat projecting, as broad as long, dusted, with numerous short *fr*. Frontal trian-

gle moderately large, broad, behind usually about 2/3 as wide as frons, with convex or straight side margins at most 1/2—2/3 as long as frons, black, smooth, heavily dusted in grey, with one to two rows of short *if* on the surface of the triangle. *oc* short as *if*, recurved, convergent. *pvt* short, stout, longer than *oc*, upright, convergent. *vii* short, incurved. *vte* stout and long as *pvt*, outcurved. 5—6 short, recurved *orb*. Face with distinct carina, triangular between the antennae, narrow and high below, forming two distinct but shallow antennal grooves. Clypeus somewhat projecting, broad, black dusted. Proboscis short. Palpi slender, cylindrical, pale. Antennae yellowish, more or less darkened at tip. *ant*₂ short with distinct dorsal bristle. *ant*₃ oval, higher than long, rather thick basally, pubescent. Arista dark, slender, pubescent.

Thorax flattened with thick grey or brown dust, and short, usually stout, bristles. Humerus dusted with a few hairs and 1 distinct *h*. Mesonotum squarish, rather flat, without or with very indistinct grooves along *acr* and *dc* lines, dusted in grey or with brown longitudinal dust-stripes, evenly covered with very short hairs, sometimes arising from stellate granulae causing rather coarse microsculpture or smooth. 1 *a npl*, 1—2 *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*, straight, subequal. Scutellum rounded, flattened, dusted, with more or less numerous short hairs on the disc, smooth or with coarse microsculpture. *ap sc* rather short, stout, more or less wide apart. 1—4 smaller *la sc*. Pleura extensively dusted, with large depressions in anterior and posterior thirds to accommodate the legs when they are withdrawn against the body. Subspiracular callus shining. *mpl* without hairs. *stpl* with few pale hairs.

Legs short and stout, blackish, more or less yellow, simple. *t*₃ often with shorter or longer *av* spur. Tibial organ well developed. Femural organ consists of two short rows of warts with short slender bristles.

Wings of *Oscinellinae*-type. *t*_p rather oblique. Halteres yellow.

Abdomen oval, flattened, brownish or with yellow markings, dusted with dark and pale hairs. The lateral infolded parts of the tergites sharply bent in, with a distinct line of weakness between the parts. Sternites broad. Female cerci long. Male cerci large, wide apart, projecting. Surstylus of *Oscinella*-type but usually of somewhat irregular shape. Post- and pregonites of *Oscinella*-type. Hypandrial arms fused behind.

Distribution: Holarctic, Ethiopian and Oriental Regions.

Material studied: *Aphanotrigonum trilineatum* (Meigen); *A. nigripes* (Zetterstedt, 1848); *A. brunneum* Collin, 1946; *A. cinctellum* (Zetterstedt, 1848); *A. femorella* Collin, 1946; *A. inerme* Collin, 1946.

Genus *Tricimba* Lioy, 1864: 1125

Figs 55, 115 B.

Type species: *Oscinis lineella* Fallén, 1820.

Synonymy: *Notonaulax* Becker, 1903: 103, type species: *Oscinis lineella* Fallén, 1820; *Hammaspis* Duda, 1930: 76, type species: *Tricimba spinigera* Malloch, 1913; *Tricymba* von Marschall, 1873: 349 (emendation) (Sabrosky 1941).

Small, 1.5—2.5 mm, black, heavily dusted species with three sharp longitudinal furrows on mesonotum.

Head higher than long, black with jowls face and frons usually yellowish, and short, yellow or dark hairs and bristles. Eyes rounded with vertical or oblique long axes, sparse short, or more numerous longer hairs. Jowls narrower than *ant*₃ with one row of hairs below. Vibrissal angle projecting. *vi* distinct. Cheeks not visible in lateral view. Frons somewhat projecting, as broad as long, dusted, with few to numerous *fr*. Frontal triangle small, behind 1/3—3/4 as broad as frons with straight side margins almost reaching middle of frons, smooth, dusted, dark. *if* in one row along the margin of the triangle, incurved. *oc* and vertical bristles short and stout. *oc* recurved, convergent. *pvt* upright, recurved. *vii* absent or incurved. *vte* outcurved. 5—8 recurved *orb*. Facial carina distinct, narrow, triangular above, membranous in lower half, reaching epistoma. Clypeus black or yellow, shining. Proboscis of medium size. Palpi cylindrical, yellow. Antennae yellow, apically more or less darkened. *ant*₂ short. *ant*₃ rounded, higher than long, broad below, onion-like, with short pubescence. Arista slender, basally yellowish, apically dark, shortly pubescent.

Thorax black, extensively dusted in grey or yellow with pale yellow or dark, usually short and stout, hairs and bristles. Humerus dusted with few hairs and 1 *h*. Mesonotum moderately convex, with three longitudinal, sharp, deep furrows, two along *dc* lines and one in the middle. The furrows along *dc* lines have two rows of parted hairs arising from distinct granulae. The central furrow has one row of hairs, parted or unparted, arising from granu-

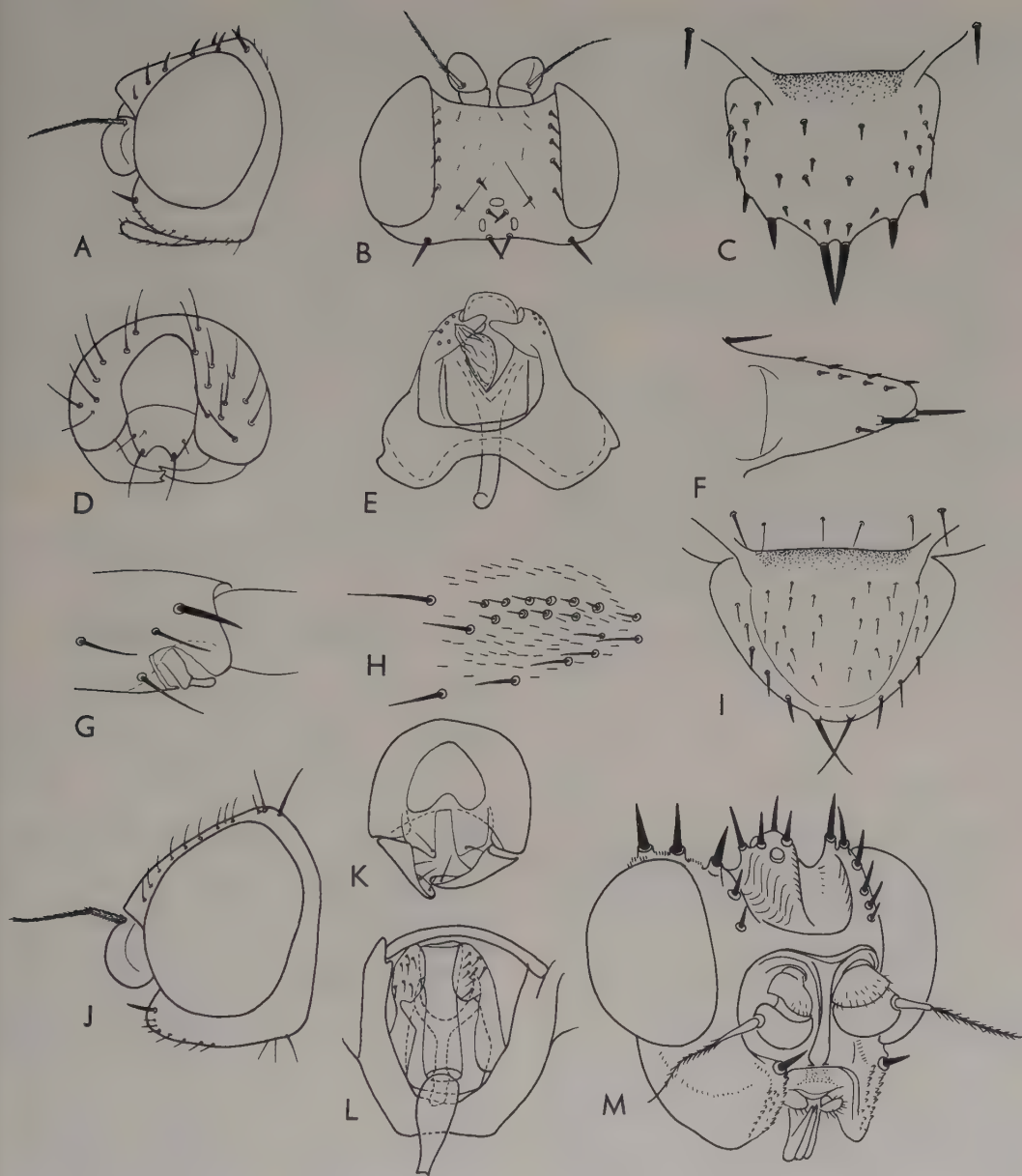


Fig. 55. — A—G. *Tricimba lineella* (Fallén). — A. Head, lateral view. — B. Head, dorsal view. — C. Scutellum, dorsal view. — D. Epandrium, posterior view. — E. Phallic complex. — F. Scutellum, lateral view. — G. Ventral appendage at apical end of f_2 . Lateral wall of f_2 partly removed. — H—L. *Tricimba cincta* (Meigen). — H. Femural organ. — I. Scutellum, dorsal view. — J. Head, lateral view. — K. Epandrium, posterior view. — L. Phallic complex, ventral view. — M. *Echimba armata* (Séguy), head, anterolateral view (from Séguy 1938, redrawn).

lae. On the surface of mesonotum outside the furrows are more or less numerous short hairs. Thoracic bristles relatively short but usually very stout. 1 *a npl*, 1—2 *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*. Notopleural area usually distinctly de-

marked, sunken in. Scutellum dorsally flattened, thin or thick with convex side margins, dusted, with numerous hairs. *ap sc* short, often distinctly approximated, 1—4 short *la sc*. When the scutellum is thin the *sc* are situated at the

same level as the upper surface, when the scutellum is thick the scutellars are situated at the same level as the lower surface (as in *lineella*). *sc* sometimes arising from distinct warts. Propleura, anterior part of *mpl* and *stpl*, posterior part of *stpl* and *ptpl* and the whole of *hpl* usually shining, pleura otherwise dusted and smooth. *mpl* without hairs. *stpl* with few hairs.

Legs simple, yellowish, t_2 and t_3 often with 1 or 2 dark rings. Tibial organ distinct, oval. Femoral organ absent or present as two rows of warts.

Wings of Oscinellinae-type. First basal cell sometimes widened (as in *lineella*) but then r_{2+3} not shortened. t_p oblique. Halteres yellow.

Abdomen oval, yellowish to black, dusted with yellow or dark hairs. Female cerci slender. Male cerci fused (as in *lineella*) or free, separated. Postgonites with medially directed projection or simple. Phallus longer or shorter.

Distribution: Species of *Tricimba* s. lat. have been reported from all regions.

Material studied: *Tricimba lineella* (Fallén); *T. cincta* (Meigen, 1830); *T. humeralis* (Loew, 1858).

Genus *Echimba* Duda, 1935: 27

Fig. 55 M.

Type species: *Echimba annulipes* Duda, 1935.

Synonymy: *Syphonerina*, Séguy, 1938: 361, type species: *Syphonerina armata* Séguy, 1938 (Sabrosky 1951).

There are two evolutionary trends within the species above included in *Tricimba*; one is represented by the type species *T. lineella* (Fall.) the other by *T. cincta* (Meig.). The *lineella* strain is characterized by almost naked eyes, very short and stout bristles on head, thorax and scutellum, 1 *p npl*, few *fr*, few hairs on mesonotum between the furrows, thick scutellum with low inserted *sc*, sometimes arising from warts, broadened first basal cell and absence of femoral organ. The *cincta* group differs in having distinctly, rather densely, haired eyes, numerous *fr*, numerous hairs on mesonotum, short but not so obviously thickened bristles, 2 *p npl*, thin, flatter scutellum with *sc* inserted more in level with the upper surface and not arising from warts and normally slender basal cell. If *Echimba annulipes* Duda and other deviating forms are taken into consideration the above-mentioned pattern breaks down. A flat scutellum with high in-

serted *sc*, numerous *fr*, and slender basal cell, hairy eyes, etc. is in various ways combined with *sc* arising from warts, increasingly less hairy eyes, decreasing number of mesonotal hairs, stouter bristles, 1 *p npl*, and so on. However these intermediate forms have a rather different head with high, not membranous facial carina, sometimes considerably broad, and a very large epistomal field. The head may also be considerably longer than high, or equipped with ridges on postgenae. The pleura are also almost completely dusted. Unfortunately no males of these forms are available for study. Especially in view of the deviating head characters I am at present, in spite of the fact that I consider these forms belong to the *Tricimba* genus group, not prepared to accept *Echimba* as a synonym of *Tricimba*.

Distribution: Africa.

Material studied: Females of some aberrant, probably undescribed African species.

Genus *Crassivenula* Sabrosky, 1941: 751

Fig. 56.

Type species: *Neuropachys brachyptera* Thalhammer, 1913.

Synonymy: *Neuropachys* Thalhammer, 1913: 1, type species: *Neuropachys brachyptera* Thalhammer, 1913.

Small, 0.75 mm, brachypterous species with thorax and short scutellum.

Head black with yellowish jowls, face and front of frons, and with very minute dark bristles. Eyes rounded with vertical long axes, with sparse short hairs. Jowls as broad as ant₃. Vibrissal angle somewhat projecting. *vi* distinct, pale. Frons somewhat projecting, as long as broad, dusted. Frontal triangle indistinct. Proboscis short. Palpi cylindrical, yellow. Facial carina membranous, well developed. Ant₃ yellowish, onion-shaped. Arista long, dark slender, almost naked.

Thorax short and broad, black, dorsally with thick grey dust, with short bristles and almost without hairs. 1 *p npl*. Scutellum relatively large, flat, with short *ap sc* wide apart.

Legs yellowish, partly darkened. With distinct tibial organ, without femoral organ.

Wings very short with distinct veins.

Abdomen oval. Tergites not folded in under abdomen. T₅ in male unusually long, 1.5 times as long as T₄. S₃ and S₄ triangular. Epandrium short. Cerci broadly apart, pointed. Surstyli simple. Postgonites apically serrate. Phallus short.

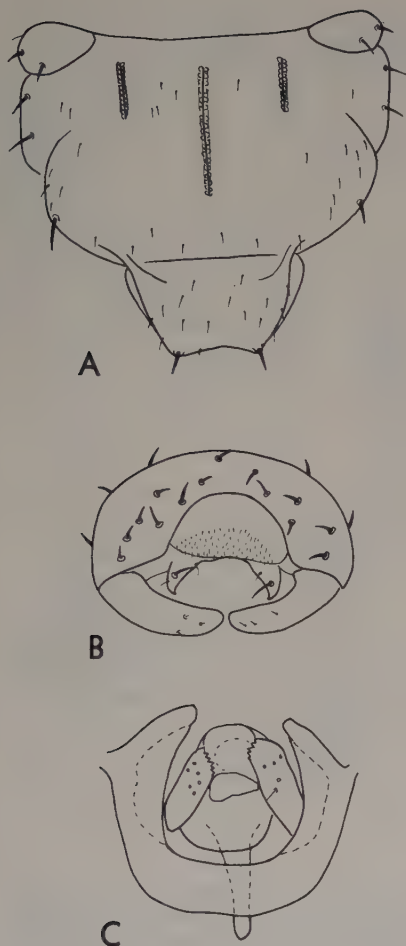


Fig. 56. — A—C. *Crassivenula brachyptera* (Thalhammer). — A. Thorax, dorsal view. — B. Epandrium, posterior view. — C. Phallic complex, ventral view.

Distribution: Europe.

Material studied: *Crassivenula brachyptera* (Thalhammer).

Genus *Trachysiphonella* Enderlein, 1936: 187

Figs 57, 115 C.

Type species: *Oscinis scutellata* von Roser, 1840, as *Oscinis pumilio* Zetterstedt, 1848.

Small, 1–2 mm, yellow species with black markings, prolonged proboscis and extremely small frontal triangle.

Head higher than long, yellow with dark

hairs and bristles. Eyes oval with oblique long axes, densely hairy. Jowls narrower than ant₃ with numerous hairs in lower half. Vibrissal angle projecting. vi distinct. Cheeks linear. Frons somewhat projecting, longer than broad, dusted with numerous fr. Frontal triangle very small, behind at most as broad as half frons with straight side margins at most 1/4 as long as frons, yellow or brown, dusted. if in one row along the margin of the triangle, incurved. oc small, recurved, cruciate. vii somewhat stronger than oc, incurved. vte somewhat stronger than pvt, outcurved. About 9, recurved, distinct orb, the posterior one almost as long as vii. Face with distinct, narrow carina, triangular in upper part, reaching epistoma and forming two deep antennal forvae. Clypeus linear, black, shining. Proboscis prolonged, labella usually longer than t₁. Palpi long, cylindrical or flattened, yellow with dark hairs. Antennae yellow apically darkened. ant₂ distinct. ant₃ small, higher than long, basally thick, onion-shaped, with short pubescence. Arista dark, rather short, pubescent.

Thorax yellow with black markings and dark hairs and bristles. Humerus usually with dark spots, dusted, with numerous hairs and 1 long h. Mesonotum moderately convex with indistinct depression along dc lines, with five longitudinal stripes, smooth, dusted, evenly covered with numerous dark hairs. Thoracic bristles rather long. 1 a npl, 2 p npl, 1 a pa, 1 smaller p pa, 1 dc. Usually 2–4 more distinct psc. Scutellum rounded, flattened, yellow, smooth, dusted, with numerous hairs on the disc. ap sc longer than scutellum, rather wide apart. 1–2 shorter la sc. Pleura yellow with 1–3 dark spots, smooth. mpl partly dusted, without hairs. stpl dusted below, with few hairs. ptpl dusted above.

Legs rather stout, simple, yellow, partly darkened. Tibial organ narrow. Femoral organ an oval group of warts.

Wings of Oscinellinae-type. Anterior basal field narrow. t_p oblique. Halteres yellow or white.

Abdomen oval, yellow with brown transverse bands, dusted, with distinct dark hairs. Female cerci slender. Male cerci free. Postgonites with sclerotized projections.

Distribution: Palaearctic Region.

Material studied: *Trachysiphonella scutellata* (von Roser); *T. pygmaea* (Meigen, 1838); *T. ruficeps* (Macquart, 1835).

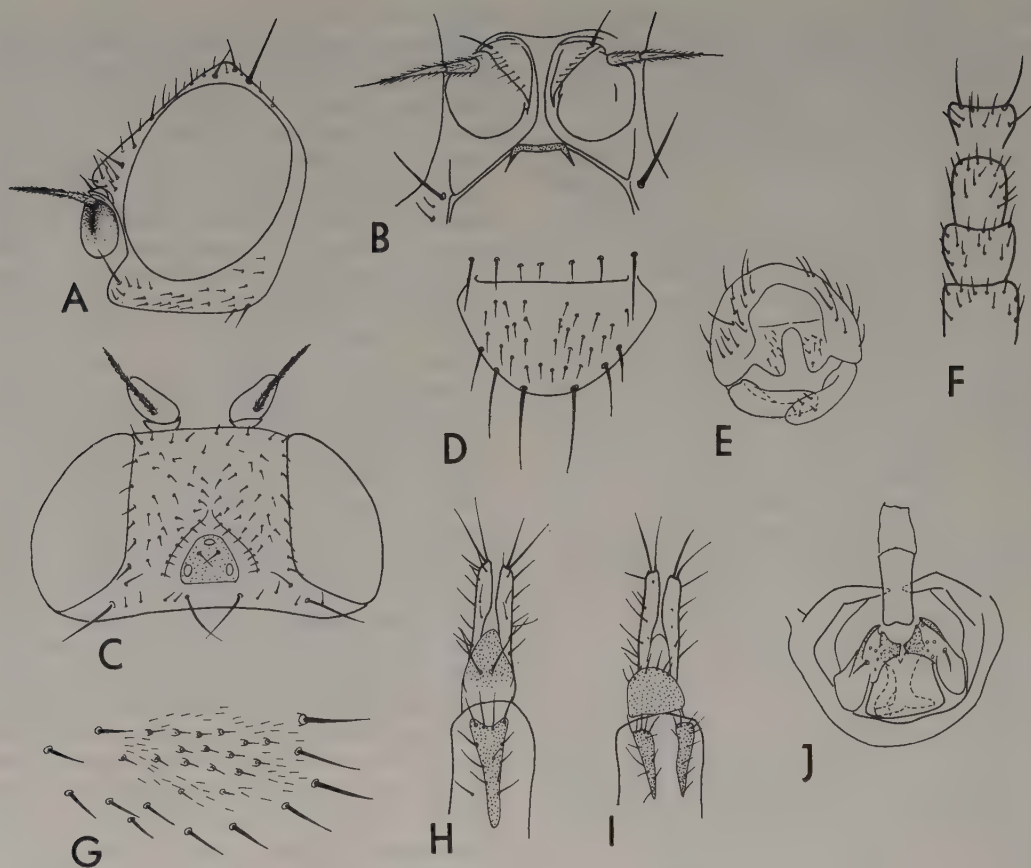


Fig. 57. — A—J. *Trachysiphonella scutellata* (von Roser). — A. Head, lateral view. — B. Face, anterior view. — C. Head, dorsal view. — D. Scutellum, dorsal view. — E. Epanandrium, posterior view. — F. Male S_4 — S_5 . — G. Femoral organ. — H. Apex of ovipositor, dorsal view. — I. Ditto, ventral view. — J. Phallic complex, ventral view.

Genus **Oscinimorpha** Lioy, 1864: 1126

Figs 58, 115 D.

Type species: Oscinis obliqua Macquart, 1835.

Small, 1.5—3 mm, black species with projecting vibrissal angle, prolonged proboscis and black hairs and bristles.

Head higher than long, completely black or with jowls, face and front of frons yellowish, hairs and bristles black. Eyes oval with oblique long axes, pubescent. Jowls narrow, linear to broad as ant_3 , dusted or shining below with one or more rows of hairs below. *vi* distinct. Vibrissal angle distinctly projecting beyond frons. Cheeks narrow. Frons somewhat projecting, longer than broad, dusted with numerous *fr*. Frontal triangle behind broad, almost as broad as frons, short, only $1/3$ — $1/2$ as long as frons, black, dusted, smooth. *if* in one row

along margin of the triangle, incurved. *oc* short, upright or recurved, convergent. *pvt* about twice as long as *oc*, upright, cruciate. *vti* shorter, incurved. *vte* long as *pvt*, outcurved. *orb* about 8, short, recurved. Face concave with narrow carina, narrowly triangular above, very thin below, reaching epistoma. Clypeus black, shining or dusted. Proboscis moderately prolonged. Labella not as long as t_1 . Palpi cylindrical, short, not as long as labella, yellow or black. Antennae black or partly yellow. ant_2 short. ant_3 rounded, higher than long with short pubescence.

Thorax black, with black hairs and bristles. Humerous dusted, with hairs and 1 *h*. Mesonotum moderately convex, smooth or with only shallow depression along *dc* lines, dusted, evenly covered by more or less numerous short hairs which are not parted along *dc* lines.

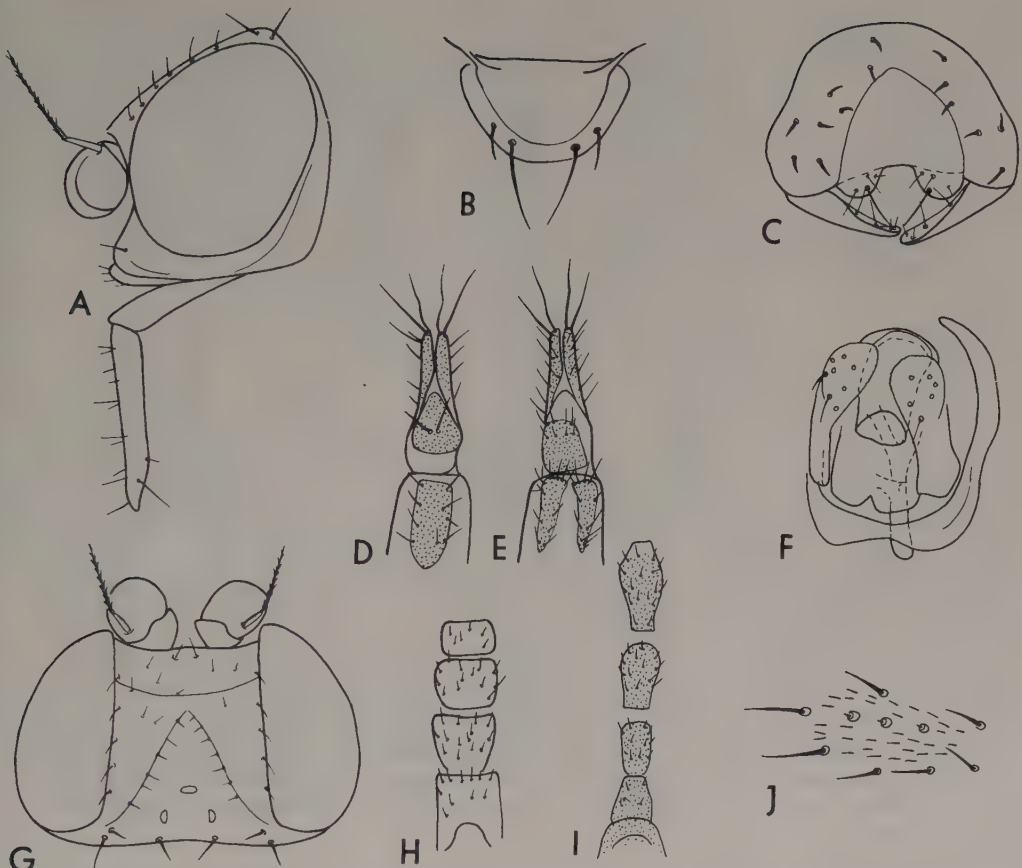


Fig. 58. — A—J. *Oscinimorpha minutissima* (Strobl). — A. Head, lateral view. — B. Scutellum, dorsal view. — C. Epandrium, posterior view. — D. Apex of ovipositor, dorsal view. — E. Ditto, ventral view. — F. Phallic complex, ventral view. — G. Head, dorsal view. — H. Male S_2 — S_5 . — I. Female S_1 — S_5 . — J. Femural organ.

Thoracic bristles distinct. 1 *a npl*, 1—2 *p npl*, 1 *a pa*, 1 small *p pa*, 1 *dc*. Scutellum rounded, convex or slightly flattened, smooth, black, dusted, with few hairs on the disc. *ap sc* about as long as scutellum. 1 shorter *la sc*. Pleura shining, smooth, partly dusted. *mpl* above and *ptpl* dusted. *mpl* without hairs. *stpl* shining, with few hairs.

Legs slender, simple, black or partly yellowish. Tibial organ narrow. Femural organ one row of warts.

Wings of *Oscinella*-type with rather oblique t_p . Halteres yellow.

Abdomen oval, dark, dusted with dark hairs. Female cerci slender. Male genitalia of *Conioscinella*-type.

Distribution: Palaearctic Region.

Material studied: *Oscinimorpha minutissima* (Strobl, 1900); *O. sordidissima* (Strobl, 1893).

Genus *Conioscinella* Duda, 1929: 169

Figs 59, 115 E.

Type species: *Oscinella soluta* Becker, 1912.

Small, 1.0—2.5 mm, black species with brownish frons, small, dusted frontal triangle and hairy eyes.

Head higher than long, black with more or less yellowish jowls, face and frons, and rather short, dark or yellow hairs and bristles. Eyes large, oval, distinctly hairy, with vertical long axes. Jowls narrower than ant_3 , sometimes even narrower than t_1 , dusted, with one row of hairs. *vi* distinct. Vibrissal angle straight or somewhat projecting, broader than long, dusted, with numerous *fr*. Frontal triangle behind $2/3$ as broad as frons, with almost straight side margins reaching to about middle of frons, smooth, dusted. *if* in one row along margin of triangle,

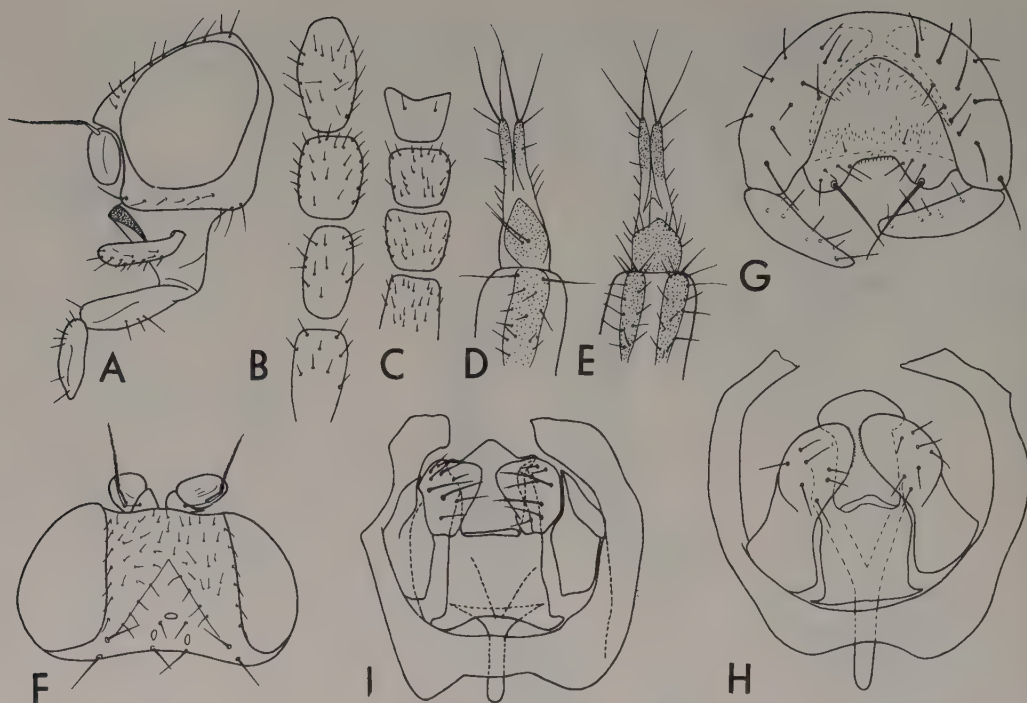


Fig. 59. — A—F. *Conioscinella frontella* (Fallén). — A. Head, lateral view. — B. Female S_2 — S_5 . — C. Male S_2 — S_5 . — D. Apex of ovipositor, dorsal view. — E. Ditto, ventral view. — F. Head, dorsal view. — G—H. *Conioscinella mimula* Collin. — G. Epandrium, posterior view. — H. Phallic complex, ventral view. — I. *Conioscinella zetterstedti* Andersson, phallic complex, ventral view.

incurved. *oc* distinct, somewhat longer than *if*, recurved, parallel. *pvt* at least twice as long as *oc*, upright or recurved, cruciate. *vti* shorter than *pvt*, incurved. *vte* outcurved. *orb* 8—10, recurved, short. Face concave with distinct, narrow carina, triangular between the antennae, reaching epistoma. Clypeus dusted, dark. Proboscis short. Palpi cylindrical, yellow or black. Antennae small, yellow, more or less darkened. *ant*₂ small. *ant*₃ rounded oval, higher than long, pubescent, rather thick, onion-shaped. Arista slender, dark, pubescent.

Thorax black with dark or yellow hairs and bristles. Humerus with few hairs and 1 *h*. Mesonotum moderately convex, smooth, dusted, sometimes with small shining spots around the base of the hairs, with indistinct and shallow depressions along *dc* lines, evenly covered with short hairs. Thoracic bristles distinct, slender. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 small *p pa*, 1 *dc*. Scutellum rounded, convex or slightly flattened, black, dusted, hairy, smooth or with indistinct transverse microsculpture. *ap sc* almost as long as scutellum, 1—3 short *la sc*.

Pleura black, partly shining, *mpl* and *ptpl* in most parts dusted, without hairs. *stpl* shining except below, with a few pale hairs.

Legs short, simple, black or yellow. Tibial organ distinct oval. Femural organ one row of warts.

Wings of *Oscinella*-type or with *t*_p more oblique. Halteres yellow.

Abdomen oval black, dusted, subshining, with dark or pale hairs. Female cerci long. Male cerci distinctly separate. Surstyli simple. Postgonites relatively large and broad. Hypandrium not closed behind. Phallus short.

Distribution: Uncertain but recorded from all regions.

Material studied: *Conioscinella frontella* (Fallén, 1820); *C. mimula* Collin, 1946; *C. halophila* Duda, 1933; *C. gallarum* (Duda, 1933); *C. sordidella* (Zetterstedt, 1848).

Remarks. The distribution of *Conioscinella* is very uncertain. Many species recorded in this genus may belong to *Tropidoscinis*, *Oscinimorpha*, *Trachysiphonella* or other genera with dusted frontal triangle.

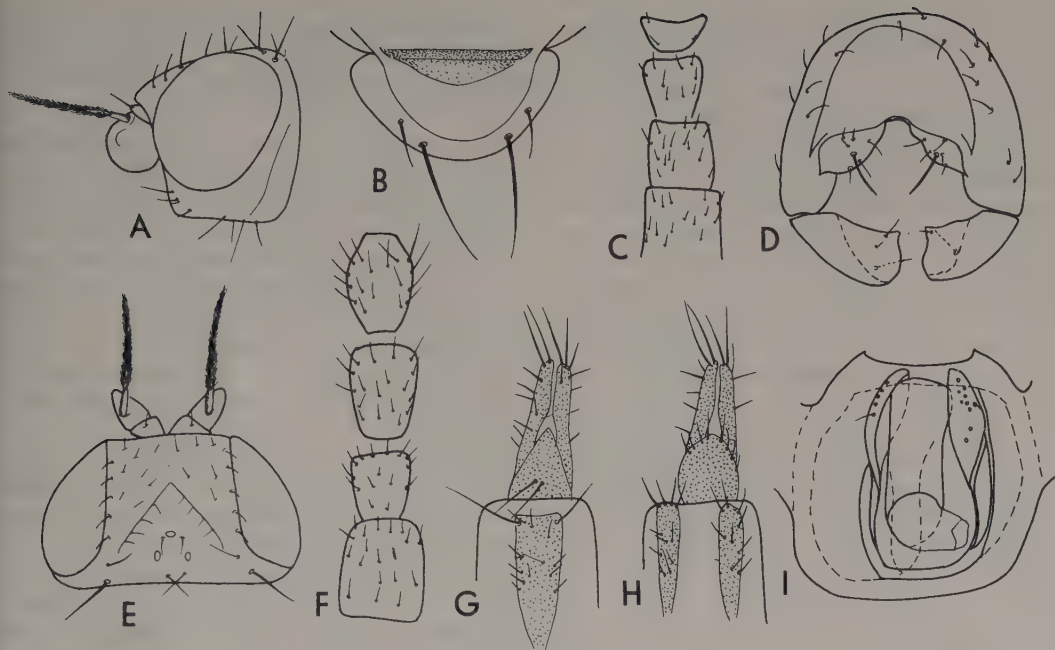


Fig. 60. — A—I. *Tropidoscinis albipalpis* (Meigen). — A. Head, lateral view. — B. Scutellum, dorsal view. — C. Male S_2-S_5 . — D. Epandrium, posterior view. — E. Head, dorsal view. — F. Female S_2-S_5 . — G. Apex of ovipositor, dorsal view. — H. Ditto, ventral view. — I. Phallic complex, ventral view.

The *Oscinella* genus group

The *Oscinella* genus group is characterized by a reduced facial carina, at most present as a low ridge; not projecting vibrissal angle; recurved *oc*; femural and tibial organs present; distinct, basally not fused cerci and simple, flat surstyli.

Tropidoscinis Enderlein has a relatively small, dusted frontal triangle, yellowish front of frons, hairs on mesonotum arranged in lines, a straight or convex anterior margin of frons and a closed hypandrial ring. It may be difficult to distinguish the genus from *Conioscinella* but the size of facial carina, vibrissal angles and hairiness on the mesonotum is decisive.

Oscinella Becker normally has black head, concave anterior margin of frons, shining frontal triangle and hairs on mesonotum arranged in rows.

Hapleginella Duda has yellowish jowls, face and antennae, a shining frontal triangle with *if* on the surface of the triangle, the anterior margin of frons is straight or convex and the hairs on the mesonotum are short and evenly

dispersed. The phallopodemic sclerite is large, bowl-shaped.

Liioscinella Duda has a straight anterior margin of frons, shining frontal triangle with *if* along the margin, rather long hairs evenly dispersed over the mesonotum, bifid postgonites and relatively long wings.

Genus *Tropidoscinis* Enderlein, 1911: 226

Figs 60, 115 F.

Type species: Tropidoscinis luederwaldti Enderlein, 1911.

Synonymy: Neoolcanabates Duda, 1930: 97, type species: *Tropidoscinis luederwaldti* Enderlein, 1911 (Sabrosky 1941).

Small, 1.5—2.5 mm, black species with dusted frontal triangle, right vibrissal angle, and convex front of frons.

Head higher than long, black, jowls face and front of frons often more or less yellow, with yellow or dark hairs and dark bristles. Eyes rounded oval with oblique long axes, hairy. Jowls narrower than ant_3 with 1—2 rows of

hairs below. Vibrissal angle right, not projecting nor retreating. *vi* distinct, short. Cheeks not visible. Frons somewhat projecting, broader than long, dusted, with some *fr*. Frontal triangle behind almost as broad as frons, with straight or somewhat convex side margins reaching to middle or front of frons, black, dusted, smooth. *if* in one row along the margin, incurved. *oc* short, recurved, convergent. *pvt* stronger than *oc*, upright, cruciate. *vti* long as *oc*, incurved. *vte* long as *pvt*, outcurved. 5—6 recurved *orb*, the 3 posterior ones usually stronger. Face concave. Facial carina short, above narrowly triangular, reaching middle of face. Clypeus black, shining. Proboscis short. Palpi slender, yellow or dark. Antennae black, or partly yellow. *ant*₂ small. *ant*₃ rounded, higher than long with short pubescence. Arista slender, dark, moderately pubescent.

Thorax black, with black hairs and bristles. Humerus dusted, with few hairs and 1 *h*. Mesonotum moderately convex, smooth, dusted, with relatively few short hairs, arranged in parted rows along *acr* and *dc* lines. Thoracic bristles distinct, slender. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 small *p pa*, 1 long *dc*. Scutellum rounded, convex, black, dusted, with very few hairs above. *ap sc* about as long as scutellum. 1 *la sc*. Pleura smooth, largely shining. *mpl*, except in front and below, dusted, without hairs. *stpl* shining, with few hairs. *ptpl* dusted.

Legs simple, black, tibiae and tarsi more or less yellow. Tibial organ distinct, oval. Femoral organ two rows of warts with short, stout spines (fig. 13 C).

Wings of Oscinellinae-type. *t*_p rather oblique. Halteres yellow.

Abdomen oval, brownish, dusted with dark hairs. Female cerci slender. Male genitalia of Oscinellinae-type.

Distribution: Uncertain, but widely recorded. My interpretation of the genus refers to Palaearctic material.

Material studied: *Tropidoscinis albipalpis* (Meigen, 1830); *T. antennata* Collin, 1946; *T. kerteszi* (Becker, 1910); *T. zurcheri* Duda 1933.

Genus *Oscinella* Becker, 1909: 120

Figs 13 D, 61, 115 G.

Type species: *Oscinella deficiens* Becker, 1909. The type specimens of *O. deficiens* Becker are lost and it remains a species dubia, probably belonging to another taxon than that universally accepted as *Oscinella* (i.e. the group of *Oscinella*

frit Linnaeus and related species). Sabrosky (1973) has applied to the Commission of Zoological Nomenclature, to use its plenary power, to fix *Musca frit* Linnaeus, 1761, as type species of *Oscinella* Becker, 1909.

Small, 1.5—2.5 mm, black species with shining frontal triangle and simple antennae.

Head higher than long, black, with distinct black hairs and bristles. Eyes rounded oval, with oblique to vertical long axes, and sparse hairs. Jowls moderately broad, at most slightly broader than *ant*₃, dusted, with hairs in lower parts. Vibrissal angle right. *vi* distinct. Cheeks invisible. Frons slightly projecting, as broad as long, dusted, with incurved fore margin and a few *fr*. Frontal triangle as broad as frons or 3/4 of it, with straight side margins reaching from middle to front of frons, smooth or with very indistinct reticulated microsculpture, shining or dusted along margins and around ocellar tubercle. *oc* short, long as *if*, upright or recurved, cruciate. *pvt* longer than *oc*, upright, cruciate. *vti* short, incurved. *vte* strong as *pvt*, outcurved. Face concave with narrow, low carina reaching middle of face. Clypeus black, shining. Proboscis short. Palpi cylindrical black. Antennae black. *ant*₂ short. *ant*₃ rounded, about as long as broad, with short pubescence. Arista slender, dark or rarely white, short to relatively long and densely pubescent.

Thorax black with black bristles and hairs. Humerus shining or dusted, with some hairs and 1 *h*. Mesonotum moderately convex, shining or dusted, smooth or with more or less distinct reticulate microsculpture, with rather sparse hairs which at least along *acr* and *dc* lines are arranged in not parted lines. Thoracic bristles distinct. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 small *p pa*, 1 *dc*. Scutellum rounded, convex, smooth, dusted, with at most 2—4 hairs on the disc. *ap sc* about as long as scutellum. 1—2 short *la sc*. Pleura smooth, mainly shining. *mpl* sometimes dusted in posterior part, not hairy. *ptpl* sometimes dusted. *stpl* shining with few hairs.

Legs slender, simple, black, or more or less yellow. Tibial organ distinct oval. Femoral organ about 6—9 warts in one row.

Wings simple of general Oscinellinae-type. Halteres yellow or dark.

Abdomen oval, black, thinly dusted, subshining, with dark hairs. Female cerci long. Surstyli long, parallel-sided, incurved. Postgonites short. Distiphallus short.

Distribution: Recorded from all regions.

Material studied: *Oscinella frit* (Linnaeus);

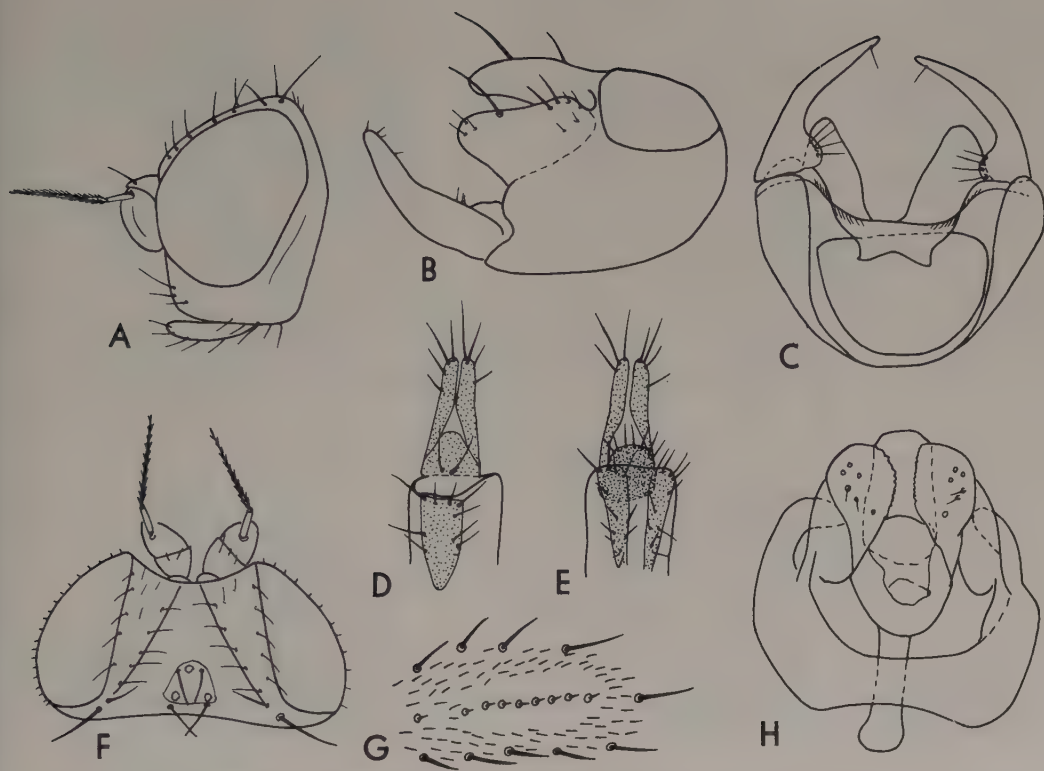


Fig. 61. A—H. *Oscinella frit* (Linnaeus). — A. Head, lateral view. — B. Epandrium, postero-lateral view. — C. Epandrium, ventral view. — D. Apex of ovipositor, dorsal view. — E. Ditto, ventral view. — F. Head, dorsal view. — G. Femoral organ. — H. Phallic complex, ventral view.

O. maura (Fallén, 1820); *O. augustipennis* Duda, 1933; *O. trigonella* Duda, 1933; *O. nitidissima* (Meigen, 1830); *O. trochanterata* Collin, 1946; *O. hortensis* Collin, 1946; *O. cariciphila* Collin, 1946.

Genus **Hapleginella** Duda, 1933: 77

Figs 62, 115 H.

Type species: Oscinis laevisfrons Loew, 1858.

Small, 1.5—2 mm, shining black, *Oscinella*-like species, with pale face and antennae but with *if* on the frontal triangle.

Head higher than long, black with jowls and face partly yellow and with moderately long black hairs and bristles. Eyes large, rounded oval with vertical long axes, naked. Jowls as narrow as width of t_1 , partly yellow with white dust, and one row of dark hairs. Vibrissal angle 90° . *vi* distinct dark. Frons somewhat projecting, broad as long, silky shining, with few *fr*.

Frontal triangle large, behind broad as frons, with straight side margins reaching front of frons, black, smooth, shining. *if* in one row on the triangle, incurved. *oc* short as *if*, recurved, convergent. Vertical bristles about twice as long as *oc*. *pvt* upright, convergent. *vti* smaller, incurved. *vte* outcurved. *orb* 6—7, recurved. Face concave. Facial carina very small, triangular between antennae, disappearing before middle of face. Clypeus broad, black, shining. Proboscis short. Palpi short, yellow, with dark hairs. Antennae small, yellow, partly darkened. ant_2 small. ant_3 rounded, squarish, higher than long with short pubescence. Arista dark, short, slender, with very short pubescence.

Thorax shining, black, with black hairs and bristles. Humerus with few hairs and 1 distinct *h*. Mesonotum moderately convex, smooth, shining, evenly covered with very short hairs. Thoracic bristles not very long but rather stout, subequal. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 small *p pa*, 1 *dc*. Scutellum rounded, convex, dusted, black,

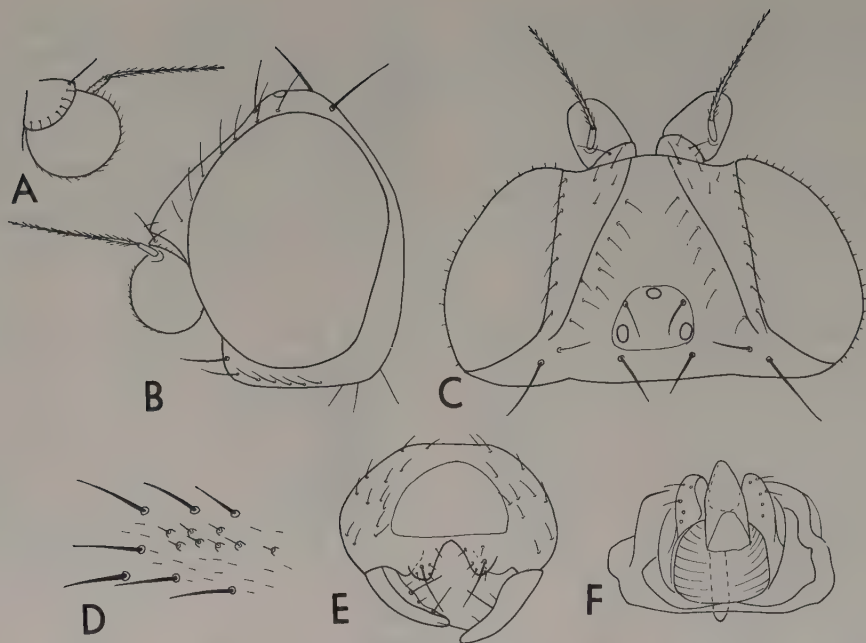


Fig. 62. — A—F. *Hapleginella laevifrons*. (Loew). — A. Antenna, inner side. — B. Head, lateral view. — C. Head, dorsal view. — D. Femural organ. — E. Epandrium, posterior view. — F. Phallic complex, ventral view.

almost smooth, with some hairs on the disc. *ap sc* about half length of scutellum, rather close together, 2 small *la sc*. Pleura smooth, shining. *mpl* without hairs. *stpl* with few hairs.

Legs short, simple, yellow, with dark femora. Tibial organ present. Femural organ composed of two short indistinct rows of warts with short, slender bristles.

Wings of *Oscinella*-type, pale. Anterior basal cell rather short and broad. Halteres yellow with black stem.

Abdomen oval, black, thinly dusted, subshining, with dark hairs. Female cerci long and slender. Male genitalia of *Oscinella*-type but with bowl-shaped phallapodemic sclerite.

Distribution: Holarctic Region.

Material studied: *Hapleginella laevifrons* (Loew).

Genus *Lioscinella* Duda, 1929: 168, 169

Figs 63, 115 I.

Type species: *Oscinosoma sulfurihalterata* Enderlein, 1911 (designated Sabrosky 1941).

Small to medium size, 2—3 mm, shining black, relatively long and slender species with long wings.

Head higher than long, black with moderately long bristles and hairs. Eyes rounded, with straight or incurved lower posterior margin, and oblique long axes, hairy. Postgenae relatively broad; jowls very narrow, almost linear, with one row of dark hairs. *vi* distinct. Vibrissal angle 90°. Cheeks not visible. Frons somewhat projecting, longer than broad, dusted, with numerous *fr*. Frontal triangle behind almost as broad as frons, with straight side margins reaching from 2/3 to front of frons, shining, black, smooth or with indistinctly reticulated microsculpture. *if* in one row on the margin of the triangle, incurved. *oc* short, recurved, convergent. Vertical bristles subequal, distinctly longer than *oc*. *pvt* upright, cruciate. *vti* incurved. *vte* outcurved. About 8 distinct, recurved *orb*. Face concave with narrow carina in upper half. Clypeus black, shining. Proboscis short. Palpi short, slender, black. Antennae black. *ant*₂ short. *ant*₃ rounded, higher than long, shortly pubescent. Arista dark, pubescent.

Thorax black, mainly shining, with black hairs and bristles. Bristles distinct but rather slender. Humerus hairy with 1 *h*. Mesonotum rather flat, sometimes distinctly flattened behind, shining, evenly covered with dark hairs,

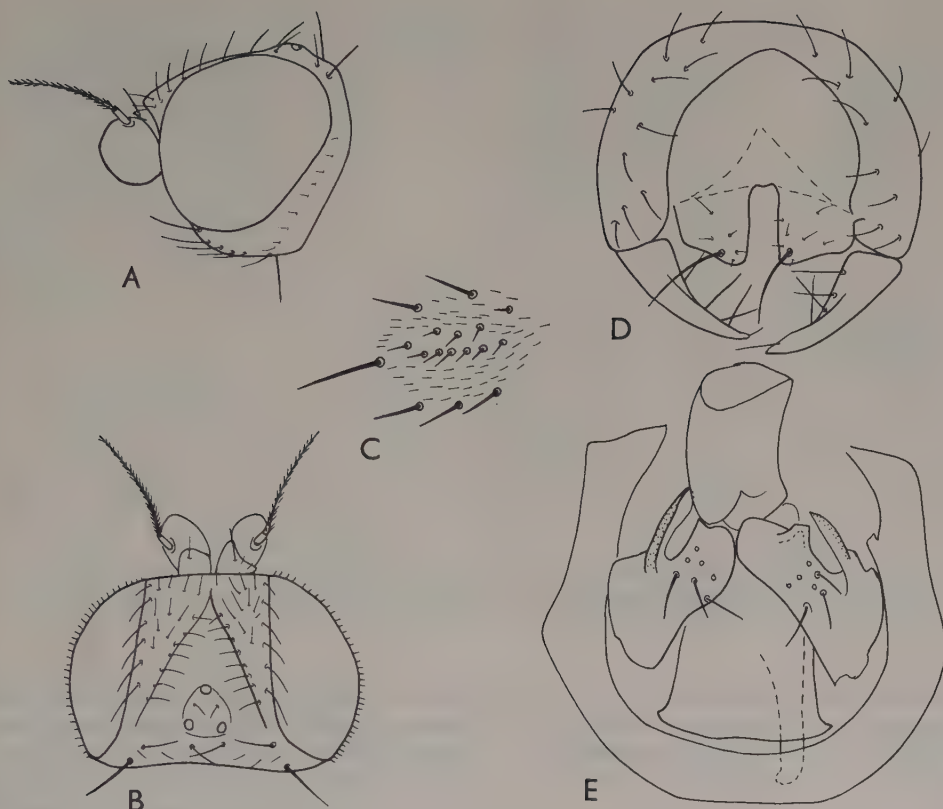


Fig. 63. — A—E. *Lioscinella atricornis* (Zetterstedt). — A. Head, lateral view. — B. Head, dorsal view. — C. Femoral organ. — D. Epandrium, posterior view. — E. Phallic complex, ventral view.

and rather indistinct microsculpture and sometimes with metallic green lustre. 1 *a npl*, 1 *p npl*, 1 *a pa*, 1 small *p pa*, 1 *dc*. Scutellum rounded, somewhat flattened, dusted, hairy above. *ap sc* slender, not quite as long as scutellum. 1—2 shorter *la sc*. Pleura smooth, mostly shining. Notopleural area and upper part of *mpl* usually dusted. *mpl* without hairs. *stpl* with few hairs.

Legs slender, simple, yellow or more or less black. Tibial organ distinct, oval. Femoral organ composed of two indistinct rows of warts.

Wings rather long and relatively narrow. *t_a* proximal of tip of *r₁*. Anterior basal cell small. Halteres yellow.

Abdomen long and narrow, black, sometimes with metallic green lustre, thinly dusted, subshining, with rather long dark hairs. Female cerci slender. Male genitalia very similar to those of *Oscinella* but postgonites with sclerotized projections.

Distribution: Uncertain, S. America; Palaearctic Region.

Material studied: *Lioscinella anthracina* (Meigen, 1830); *L. atricornis* (Zetterstedt, 1838); *L. fasciola* (Meigen, 1830); *L. femoralis* Collin, 1946; *L. atricilla* (Zetterstedt, 1838); *L. viridis* (von Roser, 1840).

The *Eribolus* genus group

The *Eribolus* genus group has facial carina, vibrissal angles, male cerci and surstyli built as in the *Oscinella* genus group. The body shape is longer (as in *Lioscinella*) but thorax is flatter, the body more thickly dusted or with coarser microsculpture. The femoral organs are not arranged in lines and the hypandrial rings are closed behind. The postgonites are different. These genera give quite a different general impression than those of the *Oscinella*

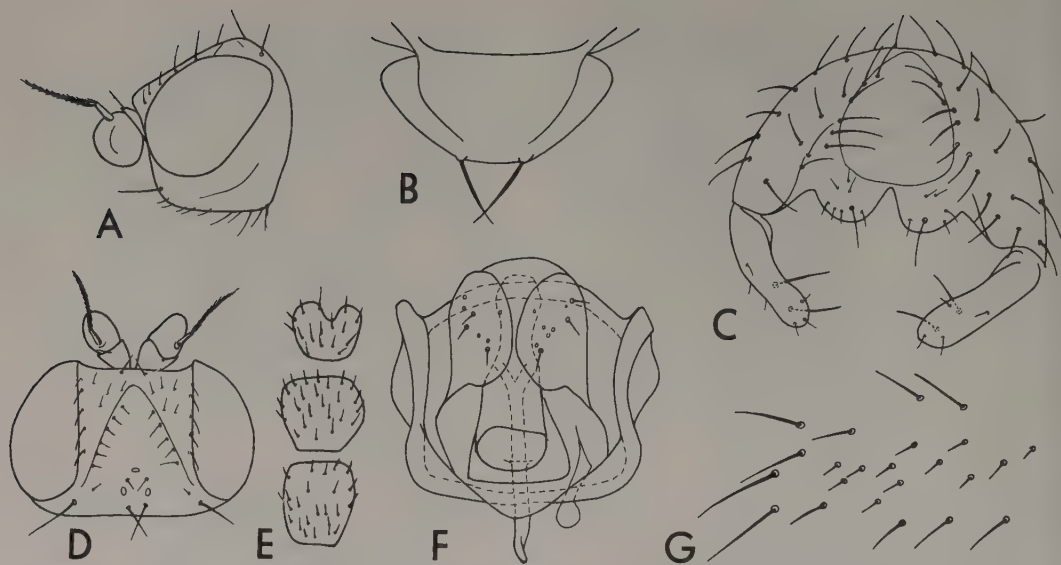


Fig. 64. — A—G. *Eribolus nana* (Zetterstedt). — A. Head, lateral view. — B. Scutellum, dorsal view. — C. Epandrium, posterior view. — D. Head, dorsal view. — E. Male S_3 — S_5 . — F. Phallic complex, ventral view. — G. Femural organ.

group. In side view the head with the oval eyes and broad postgena is similar to *Elachiptera*.

Eribolus has broad postgonites, smooth, dusted mesonotum and simple femural organ. The colour is more extensively black.

Oscinisoma Lioy has postgonites with a heavily sclerotized median process, coarse microsculpture on mesonotum and scutellum, a femural organ with stout warts and a more yellow and brownish colour.

Genus *Eribolus* Becker, 1910: 107

Figs 64, 116 A.

Type species: *Oscinis nana* Zetterstedt, 1838, as *Eribolus sudeticus* Becker, 1910 (Sabrosky 1964).

Small 1.5—2.5 mm, black species with distinctly flattened mesonotum and dusted frontal triangle.

Head somewhat higher than long, squarish, black, with rather short dark bristles. Eyes oval, somewhat incurved in lower posterior margin, therefore more or less kidney-shaped, with horizontal or oblique long axes and sparse, short hairs. Jowls black, broad, usually broad as ant_3 , in lower half sloping towards the mouth opening, dusted, in upper part with silvery white dust. vi distinct. Vibrissal angle rounded. Frons somewhat projecting, longer than broad, black or brown in front, dusted, with few fr . Frontal triangle large, behind almost as broad

as frons, with slightly convex margins reaching almost to front of frons, black, heavily dusted in grey, sometimes partly shining. *if* in one row on the margin of the triangle, incurved. *oc* short as *if*, upright or recurved, convergent. *pvt* twice as long as *oc*, upright, convergent. *vti* very small, incurved. *vte* long as *pvt*, out-curved. *orb* about 6, recurved, two of the middle ones distinctly stronger. Face flat, with flat, narrow carina. Clypeus black, dusted. Proboscis short. Palpi short, slender, black or yellow. Antennae black or partly yellow. ant_2 short. ant_3 squarish or rounded oval, higher than long with very short pubescence. Arista dark, basal segments with very short pubescence. Flagellum rather short, shortly pubescent.

Thorax black with dark hairs and bristles. Humerus dusted, with few hairs and indistinct, hair-like *h*. Mesonotum distinctly flattened, smooth, dusted, with rather sparse short hairs, arranged in lines at least along *acr* and *dc* lines. Thoracic bristles distinct. 1 *a npl*, 1 *p npl*, 1 *a pa*, 1 short *p pa*, 1 rather short *dc*. Scutellum rounded, flattened, dusted, with few hairs above. *ap sc* rather short and slender, upright. *la sc* indistinct. Pleura smooth, mostly shining. *mpl* and *stpl* largely dusted. *mpl* without hairs. *stpl* shining, except below, with few hairs.

Legs short with somewhat stout femora, black, partly yellowish. Tibial organ distinct, narrow. Femural organ composed of a group

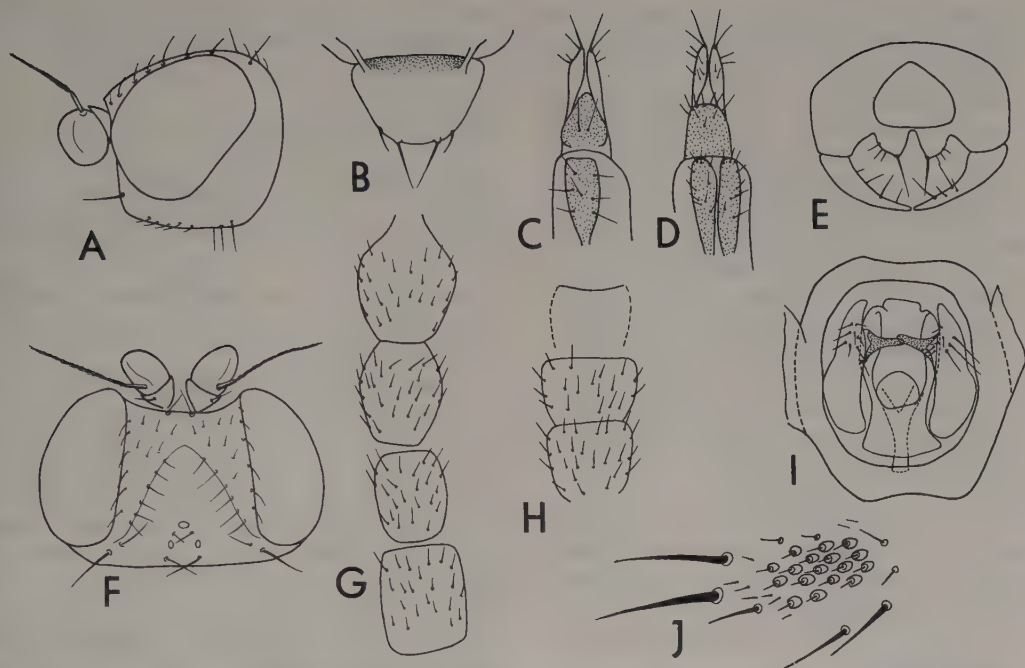


Fig. 65. — A—J. *Oscinisoma cognata* (Meigen). — A. Head, lateral view. — B. Scutellum, dorsal view. — C. Apex of ovipositor, dorsal view. — D. Ditto, ventral view. — E. Epandrium, posterior view. — F. Head, dorsal view. — G. Female S_2 — S_5 . — H. Male S_3 — S_5 . — I. Phallic complex, ventral view. — J. Femural organ.

of slightly differentiated short, slender bristles.

Wings long and narrow of *Oscinellinae*-type. Halteres yellow.

Abdomen rather long and narrow, black or dark brown, thinly dusted, subshining with dark or pale hairs. Sternites broad. Female cerci slender. Postgonites rather large. Distiphallus long, cylindrical. Hypandrium closed behind. Cerci separated.

Distribution: Holarctic region.

Material studied: *Eribolus nana* (Zetterstedt); *E. hungaricus* Becker, 1910; *E. slesvicensis* Becker, 1910; *E. gracilior* de Meijere, 1918.

Genus *Oscinisoma* Lioy, 1864: 1125

Figs 65, 116 B.

Type species: *Chlorops cognata* Meigen, 1830, as *Chlorops vitripennis* Meigen, 1830 (Sabrosky 1941).

Synonymy: *Oscinosoma* Enderlein, 1911 (emendation).

Medium size, 2.5—3 mm, *Eribolus*-like, dark species with partly yellow head, flattened, granulate mesonotum and yellow legs.

Head longer than high, black behind, largely yellow in front, with distinct, brownish hairs and bristles. Eyes oval with oblique to horizontal long axes, hairy. Jowls almost broad as ant_3 , yellow in anterior part, with silvery white dust and pale hairs below. vi distinct. Vibrissal angle right, not projecting. Cheeks not visible. Frons slightly projecting, longer than broad, dusted, with som fr . Frontal triangle behind almost as broad as frons, with slightly convex side margins reaching $1/2$ — $2/3$ length of frons, dark, smooth, shining, or partly dusted especially along margins and in two stripes anterolateral of front ocellus. if numerous, long, in one row along the margin of the frontal triangle, incurved. oc short, at most long as if , upright, cruciate. pvt stronger than oc , upright, cruciate. vte smaller than pvt , incurved. vte longer than pvt , outcurved. About 7 distinct, recurved orb . Face concave. Facial carina narrowly triangular between base of antennae, below linear, reaching to about middle of face. Clypeus black, dusted. Proboscis short. Palpi short, cylindrical, yellow in male, black in female. Antennae yellow, sometimes darkened above. ant_2 short, with distinct bristle.

ant₃ rounded, higher than long, with distinct pubescence. Arista dark with short pubescence.

Thorax dark brown to black, with yellowish to dark hairs and bristles. Humerus shining or dusted with some hairs and indistinct *h*. Mesonotum distinctly flattened, not dusted, with coarse granulated microsculpture, evenly covered with short, dark brownish hairs. Thoracic bristles distinct, short and slender. 1 *a npl*, 2 *p npl*, 1 *a pa*, *p pa* indistinct, 1 *dc*. Scutellum rounded or short squarish, flattened above, dusted, with coarse microsculpture and numerous hairs. *ap sc* very short or as long as scutellum, arising from small warts. 1—2 small *la sc* arising from more or less distinct warts. Pleura smooth, shining. *mpl* dusted on upper posterior corner, without hairs. *stpl* somewhat dusted below, with few hairs.

Legs long simple, *f*₁ somewhat thickened, yellow. Tibial organ distinct, oval. Femural organ composed of an oval group of distinct warts with slender bristles.

Wings short or long with yellowish veins. Halteres yellow.

Abdomen long oval, dark, dusted, with few brownish hairs. Sternites rather broad. Female cerci long and slender. Hypandrial ring closed behind. Postgonite with large, conical, median directed processus.

Distribution: Holarctic Region.

Material studied: *Oscinisoma cognata* (Meigen); *O. gilvipes* (Loew, 1858).

Remarks. Collin (1946) included *Disco-gastrella germanica* Duda, 1932, in *Oscinisoma*. This species is rather similar to *O. cognata* Meig. in the colour of head, body and legs, in the arrangement of bristles on head and thorax, and in the presence of small warts on scutellum. There are many differences: viz., the frontal triangle is completely dusted, the head is higher than long, the eyes are more rounded with almost vertical long axes, the thoracic bristles are longer, the mesonotum is not so flat with weaker microsculpture and distinctly dusted, the scutellum is prolonged, longer than broad. Furthermore the postgonites lack the conical processus and are of a more generalized Oscinellinae-type.

Genus not attributed to a genus group

Pselaphia Becker, of which I have only seen females, has a somewhat aberrant appearance due to the high head and large antennae. There is nothing specific that points towards any

special genus group but its relations seem to be closest to the *Oscinella* genus group.

Genus *Pselaphia* Becker, 1911: 117

Figs 66, 115 J.

Type species: *Pselaphia macrocera* Becker, 1911.

Synonymy: *Pselaphila* Becker 1912: 250 (emendation).

Small, 1—2 mm, brownish indistinct yellowish to blackish species with prolonged antennae and hairy eyes.

Head higher than long yellow, occiput partly dark. Eyes oval with vertical long axes, distinctly hairy. Jowls short, moderately broad, about half as broad as ant₃, shining, with two rows of pale hairs below. *vi* short, dark. Cheeks linear. Frons somewhat projecting, broader than long, dusted, with numerous dark *fr*. Head bristles short, dark. Frontal triangle behind 3/4 as broad as frons, with somewhat convex side margins reaching middle of frons, black, smooth, dusted. *if* dispersed over the whole of the triangle. *oc* short, recurved, convergent. *pvt* twice as long as *oc*, upright, convergent. *vti* smaller, incurved. *vte* long as *pvt*, outcurved. *orb* about 8, recurved. The posterior *orb* strong as *vti*, outcurved. Face concave, shining, with low, indistinct carina. Clypeus black, shining. Proboscis of medium size. Palpi short, stout, yellow. Antennae blackish, ant₂ yellowish below. ant₂ short. ant₃ prolonged, with straight upper and convex lower margin, about twice as long as broad, pubescent. Arista dark with short pubescence.

Thorax yellowish, with indistinct brownish spots, dorsally almost black and with dark hairs and bristles. Humerus darkened, dusted, with few hairs, 1 distinct *h*. Mesonotum moderately convex with shallow depressions along *dc* lines, smooth, dusted with grey, along *dc* lines and anterior of scutellum brown, dust, evenly covered with short hairs. Thoracic bristles distinct. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*. Scutellum dark, rounded, convex, smooth, dusted, with numerous hairs above. *ap sc* long as scutellum, 1—2 shorter *la sc*. Pleura smooth. *mpl* dusted with a dark shining spot below. *stpl* shining, except below, with few pale hairs. *prpl* shining, *ptpl* and *hpl* dusted.

Legs relatively long, slender, simple, pale or darker brownish. Tibial organ distinct, oval.

Wings of usual Oscinellinae-type. Halteres yellow with dark stem.

Abdomen oval, brownish, thinly dusted, sub-

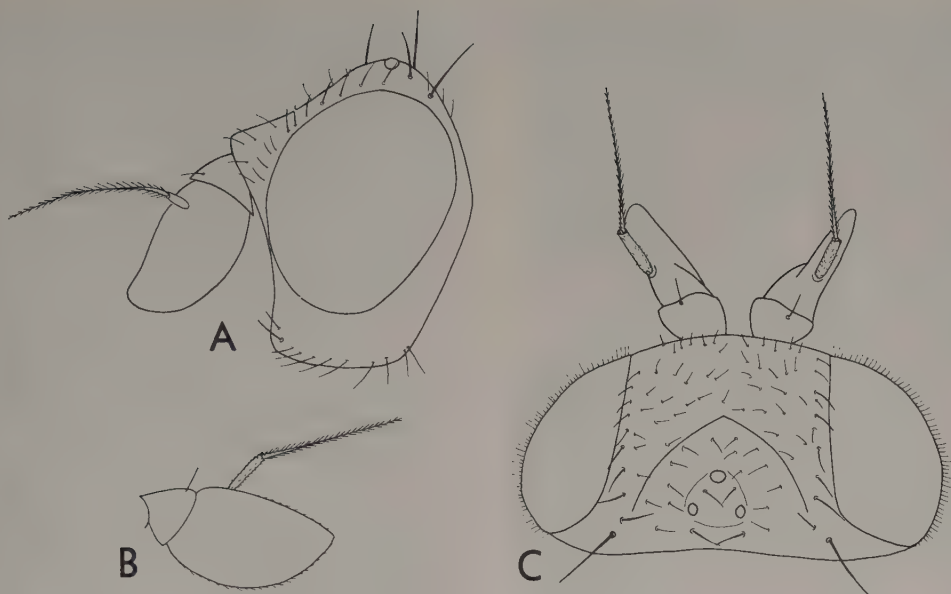


Fig. 66. — A—C. *Pselaphia cornifera* Becker. — A. Head, lateral view. — B. Antenna, inner side. — C. Head, dorsal view.

shining with short dark hairs. Sternites small, narrow. Female cerci long and slender.

Distribution: Ethiopian and Oriental Regions.

Material studied: *Pselaphia cornifera* Becker, 1912, ♀ (Ethiopia).

SUBFAMILY CHLOROPINAE RONDANI, 1856

The subfamily Chloropinae is characterized by divergent, procurved *oc*, shortened costa, reaching only to tip of r_{4+5} or slightly beyond it, slender apical segment of m_{1+2} , tendency to develop yellow or green pigments in the epidermis, absence of femoral organ, male cerci completely fused into a narrow, rectangular or oval mesolobus and by surstyli composed of upper, middle and lower lobes.

Key to genera (males)

1. r_{2+3} closely following and fused with r_1 and c. *ap sc* placed in the centre of the scutellum. Fig. 75 *Camarota* Meigen
- r_{2+3} not closely approximated to or fused with r_1 or c. *ap sc*, if distinct, placed on the margin of the scutellum 2
2. f_3 strongly thickened, ventrally usually with rows of small, dark warts. t_3 strongly curved 3

- f_3 and t_3 normal 7
3. ant_2 short. ant_3 squarish, somewhat longer than high. Arista slender with short pubescence 4
- ant_2 prolonged. ant_3 prolonged. Arista more or less thickened with dense pubescence. If ant_2 is indistinctly prolonged then ant_3 is distinctly asymmetrical, reniform or trapezoid 5
4. Head usually distinctly longer than high. Cheeks broad, visible in side view. Body ground colour pale, in living specimens usually distinctly green. Postgonites of complex shape, projecting, not black. Basiphallus short, curved. Surstyli thick, blunt, "fleshy". Fig. 68 *Meromyza* Meigen
- Head higher than long. Cheeks invisible in side view. Body ground colour yellowish brown, not green. Postgonites simple, not projecting, not black. Basiphallus short, straight. Surstyli pointed, apically strongly sclerotized. Fig. 67 *Meromyzella* n. gen.
5. ant_2 prolonged, along upper margin at least 1.5 times longer than broad. ant_3 prolonged, along lower margin at least twice as long as broad. Frontal triangle large, covering most of the frons, broadly rounded in front, reaching front margin of frons and with numerous *if* on the surface. Figs 71, 72 *Platycephala* Fallén
- ant_2 less distinctly prolonged. ant_3 reniform or trapezoid. Frontal triangle long and narrow, covering at most half breadth of frons or short

- and triangular. *if* at most in one row on the triangle 6
6. Frontal triangle shortly triangular or long and narrow. ant_3 reniform with arista in a sub-terminal or terminal position. No distinct facial carina. Fig. 69 *Pachylophus* Loew
- Frontal triangle long and narrow, not short triangular. ant_3 trapezoid with arista in a sub-terminal position. Facial carina large, thin. Fig. 70 *Platycephalisca* Nartshuk
7. Frons projecting in front of eyes for at least half length of eyes 8
- Frons less projecting 11
8. Facial carina large. Arista thickened, with very dense, dark pubescence. Fig. 70 *Platycephalisca* Nartshuk
- No distinct facial carina. Arista slender, naked or with sparse, short pubescence or with white pubescence 9
9. Frontal triangle large, broad and rounded in front, reaching front of frons. Arista pubescent. Figs 71, 72 *Platycephala* Fallén
- Frontal triangle triangular with pointed apex. Arista naked or with very short pubescence 10
10. Arista naked. All bristles and hairs long and hair-like. Central part of frontal triangle smooth, without *if*. mpl and $ptpl$ naked. Fig. 74 *Trichieurina* Duda
- Bristles distinct, body hairs very short. Frontal triangle covered by *if* arising from distinct punctures. mpl and $ptpl$ with hairs. Fig. 73 *Eurina* Meigen
11. Hypopygium with narrow, band-shaped sclerites at sides of anus (figs 99, C—D, x) .. 12
- Hypopygium without such sclerites 15
12. Eyes relatively small, jowls and cheeks broad. ant_3 large, squarish. Arista normal with short pubescence. Fig. 99 *Pseudothaumatomyia* Nartshuk
- Eyes large, jowls and cheeks narrow. ant_3 and arista different 13
13. ant_1 very small, not visible without dissection. ant_2 short. Frontal triangle triangular with pointed apex. ant_3 round. Flagellum of arista very long and slender, distinctly pubescent. Fig. 100 *Globiops* n. gen.
- ant_1 and ant_2 more or less prolonged, clearly visible. Frontal triangle more or less squarish, in front broad, obtuse 14
14. ant_1 long as ant_2 . ant_3 long and narrow, rectangular. Arista in a basal position, naked. *if* in one row on the margin of the frontal triangle. Scutellum rounded, convex. Fig. 101 *Neoloxotaenia* Sabrosky
- ant_1 shorter than ant_2 . ant_3 oblique, kidney-shaped. Arista in an apical position, very broad, with short pubescence. *if* in more than one row on the surface of the triangle. Scutellum triangular, flattened. Fig. 102 *Ensiferella* n. gen.
15. Arista very broad sword-like. ant_3 oblique, kidney-shaped 16
- Arista slender, at most moderately thickened and not sword-like. ant_3 not kidney-shaped 19
16. Wings with the distance t_a-t_p shorter than length of t_p . *orb* short, subequal, procurved 17
- Wings with the distance t_a-t_p distinctly (at least two times) longer than length of t_p . Usually 2 *orb* stronger, upright or recurved 18
17. 3 pairs of long straight *dc*. Fig. 17 *Semarangia* Becker
- Only 1 *dc* (the posterior one) present. Fig. 19 *Elachiptereicus* Becker
18. Long, slender species with extensively dusted thorax, short bristles and very long and slender legs. Postgonites and pregonites discrete. Ovipositor broad, only partly retractile. Fig. 76 *Mepachymerus* Speiser
- Moderately slender species with partly shining thorax and normal legs. Postgonites and pregonites fused. Ovipositor normal, slender, retractile. Fig. 77 *Steleocerellus* Frey
19. Postgonites with a long, free projection which is directed obliquely forwards. Phallus long, down-curved and recurved. Fig. 86 *Capnoptera* Loew
- Postgonites without such projection. Phallus not down-curved and recurved 20
20. Postgonites long, more or less fused with the phallapodemic sclerite. Pregonites long and narrow, or large and triangular, present lateral of the postgonites 21
- Postgonites and pregonites fused or gonites discrete with pregonites situated anterior of postgonites 25
21. Posterodorsal corners of epandrium projecting with a blunt, granulate end. Middle lobe of surstylus simple, flat, squarish. Fig. 82 *Anthrachophagella* n. gen.
- Epandrium without such projections. Middle lobe of surstylus apically more or less conical with granulae, hooks or similar structures 22
22. Mesonotum black, shining, with coarse, stellate microsculpture. Frontal triangle large, smooth, shining, black, with sinuate margins and with a broad tip reaching front of frons. Antennae black. Fig. 84 .. *Epichlorops* Becker
- Mesonotum smooth. Other characters not all present simultaneously 23
23. ant_3 1.5 times longer than broad. A velvety black spot present in front of inner lateral strip (M_2) on mesonotum. Pregonites at middle with a projection inserted into an incision on the hypandrium. Fig. 83 *Parectecephala* Becker
- ant_3 shorter and broader. No velvety black spot on mesonotum. Pregonites without such projection 24
24. ant_3 longer than broad. Arista white. Frontal

- triangle dusted with ridges and grooves along margins. Body with very thick, grey dust. Fig. 81 *Chlorops* subgen. *Anthracophaga* Loew
- ant₃ very slightly longer than broad, rounded or higher than long. Frontal triangle shining, seldom with a few ridges along margins. Body shining or with less thick dust. Fig. 80 *Chlorops* Meigen s. str.
25. Postgonites and pregonites more or less completely fused at least when viewed from certain directions, without distinct limits between each other 26
- Postgonites and pregonites distinctly separated 30
26. Epandrium with a flat, horsehoof-shaped, posterior surface and with a carinate margin. Cross-veins not approximated. Fig. 85 *Melanum* Becker
- Epandrium otherwise 27
27. Epandrium with well-developed subanal lobe united with the mesolobus and the posterior lobes of surstyli forming a protruding flap. ant₃ prolonged, 1.5—3 times longer than broad. Gonites not fused with phallapdeme. Cross-veins not approximated. Fig. 103 *Centorisoma* Becker
- Cross-veins close together. The distance $t_a - t_p$ shorter than length of t_p . ant₃ rounded .. 28
28. Surstyli granulate, fused with epandrium. Gonites not fused with phallapodeme. Discrete phallus present. Fig. 110 *Pseudopachychaeta* Strobl
- Surstyli not granulate, not fused with epandrium. Postgonites, pregonites, phallapodeme and phallapodemic sclerite united into a rigid structure, which articulates with the hypandrium. No discrete phallus present 29
29. *if* in one row on the frontal triangle. Mesonotum with coarse microsculpture, partly shining. Fig. 78 *Diplotox*a Loew s. str.
- *if* along the margin of the frontal triangle. Mesonotum smooth, evenly dusted. Fig. 87 *Diplotox*a subgen. *Diplotoxoides* n. subgen.
30. Posterodorsal corners of epandrium projecting. Postgonites apically with hook and with 3—4 strong bristles. S₅ in female large and broad. Fig. 88 *Cetema* Hendel
- Epandrium without such corners. S₅ in female small or moderately broadened 31
31. Surstyli not fused with epandrium 32
- Surstyli fused with epandrium 43
32. Postgonites and pregonites partly overlapping laterally. Postgonites relatively long and broad. Scutellum dorsally flattened with approximated *ap sc* 33
- Postgonites and pregonites reaching each other end to end. Scutellum normally convex. *ap sc* not approximated 37
33. Arista feather-like. Frontal triangle large, broad, rounded in front. *if* on the triangle. Fig. 92 *Thressa* Walker
- Arista normal, slender, pubescent 34
34. Frontal triangle large, broad, rounded in front. *if* on the triangle. Fig. 93 .. ?*Homops* Speiser
- Frontal triangle triangular, pointed at apex 35
35. Head short and high with very large eyes. Arista naked. *if* on the margin of the frontal triangle. Mesonotum strongly convex. Abdomen very short, broader than long. Fig. 91 *Formosina* Becker
- Head not so short and high with moderately large eyes. *if* in one or more rows on the frontal triangle. Mesonotum moderately convex. Abdomen normal, longer than broad 36
36. *if* usually in more rows. Mesonotum and scutellum distinctly hairy. Fig. 89 *Thaumatomyia* Zenker s. str.
- *if* in one row. Mesonotum and scutellum almost completely without hairs. Fig. 90 *Thaumatomyia* subgen. *Chloropisca* Loew
37. Frontal triangle with numerous *if* arising from large punctures. Figs 95, D—E *Homalura* Meigen
- Frontal triangle without large punctures .. 38
38. Basiphallus dumbbell-shaped and with coronate sclerites. Middle lobe of surstylus conical, granulate 39
- Basiphallus otherwise. Middle lobe of surstylus with a long, curved, granulate or serrate apex 40
39. Eyes large, oval with oblique or horizontal long axes. Cheeks not visible. Fig. 94 *Cryptonevra* Lioy
- Eyes small, rounded. Jowls and cheeks very broad. Figs 95, A—C *Xena* Nartshuk
40. mpl naked. A notch on anterior end of pregonites 41
- mpl with hairs 42
41. ant₃ rounded. Arista very short. Hairs and bristles white. Species black, or black and yellow, or yellow with red spots. Fig. 96 *Eutropha* Loew
- ant₃ in male large, apically broader or curved. Hairs and bristles almost absent. Dull brownish-black species. Fig. 98 .. *Cerais* v. d. Wulp
42. Shining black species with yellow head and scutellum and silvery white hairs. ant₃ prolonged with pointed dorsal apical corner. Fig. 97 *Bathyparia* Lamb
- Dull, brownish, redish or yellowish species with darker spots. Hairs slender, not silvery white. ant₃ rounded .. *Pemphigonotus* Lamb
43. Frontal triangle yellow with central oval, velvety black spot. 1 stronger *orb*. Arista very slender with white, rather dense pubescence. Fig. 109 *Metopostigma* Becker
- Frontal triangle without black spot or *if* with black spot then more than 1 strong *orb*. Arista flagellum less slender and with shorter pubescence 44
44. Surstyli present as relatively small, granulate

- and/or carinate projections (cf. figs 104 C, 105 E, 106 C) 45
- Surstyli present as long, narrower or broader projections from the epandrium or as large, granulate, conical or trapezoid structures (cf. figs 107 C, 108 E, resp. 110 C) 47
45. Frontal triangle long and narrow with longitudinal striae. Epandrium fused posteriorly of surstyli. Fig. 106 .. *Desertochlorops* Nartshuk
- Frontal triangle distinctly broader, without striae, smooth, shining. Epandrium not fused behind. ant₂ and ant₃ prolonged 46
46. Arista slender, dark. Supraanal and subanal lobes sclerotized, projecting. Postgonites long and curved. Fig. 104 *Assuania* Becker
- Arista thickened, white with dense pubescence. Anal lobes indistinct. Postgonites apically with dorsally directed hook. Fig. 105 *Lagaroceras* Becker
47. The distance $t_a - t_p$ shorter than t_p . Surstyli large, granulate structures, not quite fused with epandrium. Fig. 110 *Pseudopachychaeta* Strobl
- $t_a - t_p$ distinctly longer than t_p . Surstyli not granulate, fully fused with epandrium .. 48
48. Surstyli relatively narrow, long, sometimes long as epandrium. Eyes more rounded. ant₃ round. Fig. 107 *Lasiosina* Becker
- Surstyli very broad. Eyes long, oval. ant₃ somewhat prolonged with somewhat produced upper corner. Fig. 108 *Stenophthalmus* Becker

The *Platycephala* genus group

There are two more obvious character complexes associated with the *Platycephala* genus group. One is the thickened hind femur with two rows of short, stout spines on the ventral surface and the correspondingly curved hind tibia with two narrow ridges on the ventral side. The other is the prolonged head with strongly projecting frons and prolonged antennae, ant₃ being longer than broad, often trapezoid, rectangular or kidney-shaped. These two character complexes are not fully correlated. In connection with phylogenetic analyses for the group it therefore must be assumed that some of the characters have developed or have been reduced independently more than once. I think it is reasonable to assume that the ground-plan condition for the group is a sparsely haired mpl, thickened f_3 , curved t_3 and a tendency to develop a prolonged head, projecting frons, prolonged antennae and a thickened and strongly pubescent arista.

The ground-plan condition of the group is most closely approached by *Meromyzella* n.

gen., with strongly thickened f_3 , curved t_3 , short head and simple antennae. The type species of *Meromyzella* has usually been placed in *Meromyza* Meigen because the antennae are similar and because of similarities in the wings. Both have r_{2+3} and r_{4+5} procurved and r_{4+5} and m_{1+2} divergent. However, the veins are more strongly procurved in *Meromyza* and also the cross-vein are approximated. *Meromyza* has a special green pigment in the epidermis, if outside the narrower, shining frontal triangle and above all there are the very special male genitalia with blunt, "fleshy" surstyli, long, downcurved basiphallus and strong, projecting postgonites. *Meromyzella* has a broader, dusted frontal triangle with if on the margin of the triangle, brownish ground-colour and genitalia with the middle lobe of surstylus pointed, sclerotized and fitted with numerous granulae, postgonites not projecting and basiphallus straight and short. In most of these characters *Meromyzella* agrees with *Pachylophus* Loew. Species of *Pachylophus* with short and high head and short and triangular frontal triangle have the frontal triangle shining and surstyli without granulae. Many species of *Pachylophus* have a prolonged head and long, narrow frontal triangle. Characteristic for *Pachylophus* is a kidney-shaped ant₃ and strongly pubescent apical or subapical arista, and smooth mesonotum and scutellum. In *Meromyzella* the hairs on the mesonotum and scutellum arise from shining black warts.

Platycephalisca Nartshuk seems to be fairly close to *Pachylophus* species with prolonged head. *Platycephalisca* differs in having trapezoid ant₃ and a large, thin facial carina and slender hind legs. The phallic complex is similar to that of *Pachylophus* while the build of the epandrium and surstyli is not clear.

The genera treated above have a naked mpl.

Platycephala Fallén has more or less strongly thickened f_3 and more or less strongly curved t_3 . Many of the species with almost normal legs were originally described as *Eurina* species. *Platycephala* has a flat thorax, large, rounded frontal triangle with numerous if spread over the surface and these usually arising from distinct punctures, strongly projecting frons, prolonged antenna with ant₂ 1.5—2.0 times as long as broad, arista with rather thick pubescence and hairy mpl.

Eurina Meigen and *Trichieurina* Duda are very similar in head profile and antennae. Also the body shape, wings and legs are similar. The hind legs are simple. The genera have

usually been considered to be closely related. *Eurina* resembles *Platycephala* in the following features: frontal triangle with numerous *if* on the surface arising from punctures, hairy *mpl*, and hairs on mesonotum arising from punctures. *Eurina* differs in having frontal triangle triangular, more or less dusted, *ptpl* hairy, hind legs simple and postgonites, pregonites, phal-lapodeme, phallapodemic sclerite and basi-phallus fused into a large, broad, rigid plate without a movable phallus. The male genitalia are very different from the usual type within the genus group and functionally resemble those of the *Diptotoxa* group.

Trichieurina is characterized by a triangular, dusted frontal triangle with only few *if* at sides and by all macrochaetae being subequal, long and hair-like. Unlike *Eurina* it has naked *mpl* and *ptpl* and the male genitalia are of normal type with discrete sclerites in the phallic complex.

Camarota Meigen has many unique features such as the special wing venation, the insertion of the *ap sc* in the middle of the scutellum, the broad hypandrium and hook-shaped surstyli. The flat thorax, the hairy *mpl*, the large, squarish frontal triangle, the flat, long head and the squarish *ant*₃ resembles of *Platycephala*. However, the true affinities of *Camarota* can easily be masked by the many unique features and its relations may be quite another. The large, squarish, shining frontal triangle with a single row of *if* on the surface and the strongly thickened arista with short pubescence and short basal segments points towards the *Neotoxotaenia* group (*Ensiferella*).

Genus *Meromyzella* n. gen.

Figs 67, 116 E.

Type species: *Meromyza africana* Loew, 1860.

Medium size, about 4 mm, brownish black, heavily dusted species with thickened hind femora.

Head higher than long, yellowish brown with very short hairs and bristles, dusted. Eyes large, rounded, with oblique long axes and dispersed short hairs. Jowls broad as height of *ant*₃, with white pubescence and pale hairs in lower half. *vi* small, pale. Cheeks not visible. Frons somewhat projecting, broad as long, dusted, with few *fr*. Frontal triangle large, behind broad as frons, with slightly concave side margins reaching almost to front of frons, brownish, with heavy, almost felt-like dust. *if*

in one row on the margin of the triangle, incurved. *oc* very small, hair-like, procurved, divergent. *pvt* small, hair-like, procurved, divergent. One short, bristle-like, procurved vertical bristle (*vte* or *vti*). About 6 indistinct, recurved *orb*. Occiput large pale, above with dark hairs that continue behind eyes. Face almost flat, carina low and indistinct. Clypeus narrow, pale. Proboscis of moderate size. Palpi slender, cylindrical. Antennae yellowish. *ant*₂ short. *ant*₃ rounded squarish, about as long as high with short pubescence. Arista dark, basal segments thick, flagellum slender and shortly pubescent.

Thorax brownish with darker spots, heavy, felt-like dust and short hairs and bristles. Humerus with hairs on shining black granulae, no distinct *h*. Mesonotum squarish, moderately convex, evenly covered with short hairs arising from shining black granulae. 1 small, hair-like *a npl*, 1 distinct bristle-like *p npl*, 1 distinct *a pa*, 1 small, hair-like *p pa*, 1 hair-like *dc*. Scutellum rounded, rather flattened, pale, dusted, with numerous hairs on the disc arising from shining black granulae. *ap sc* long as half length of scutellum, situated rather far apart. No distinct *la sc*. Pleura smooth. *mpl* without hairs. *stpl* with numerous hairs arising from very small shining black spots.

Legs stout. *f*₃ strongly thickened, on the ventral side with rows of warts. *t*₃ correspondingly curved. Tibial organ present.

Wings of *Meromyza*-type. *r*₂₊₃ and *r*₄₊₅ procurved. *r*₄₊₅ and *m*₁₊₂ distinctly divergent. Halteres yellow.

Abdomen long and narrow. Tergites laterally not inflated. Sternites almost reduced. Female cerci short. Middle lobe of surstyli with large hook-like apex, basally distinctly granulated. Postgonites curved, behind with a ridge, and with 2 large bristles.

Distribution: Ethiopian Region.

Material studied: *Meromyzella africana* (Loew, 1860) n. comb.

Genus *Meromyza* Meigen, 1830: 163

Figs 68, 116 F.

Type species: *Musca saltatrix* Linné, 1761.

Synonymy: *Meromyia* Zetterstedt, 1860: 6432 (emendation) (Sabrosky 1941).

Medium size, 2—4 mm, green or yellowish green species with black or red markings and thickened hind femora.

Head longer than high, pale with dark spots

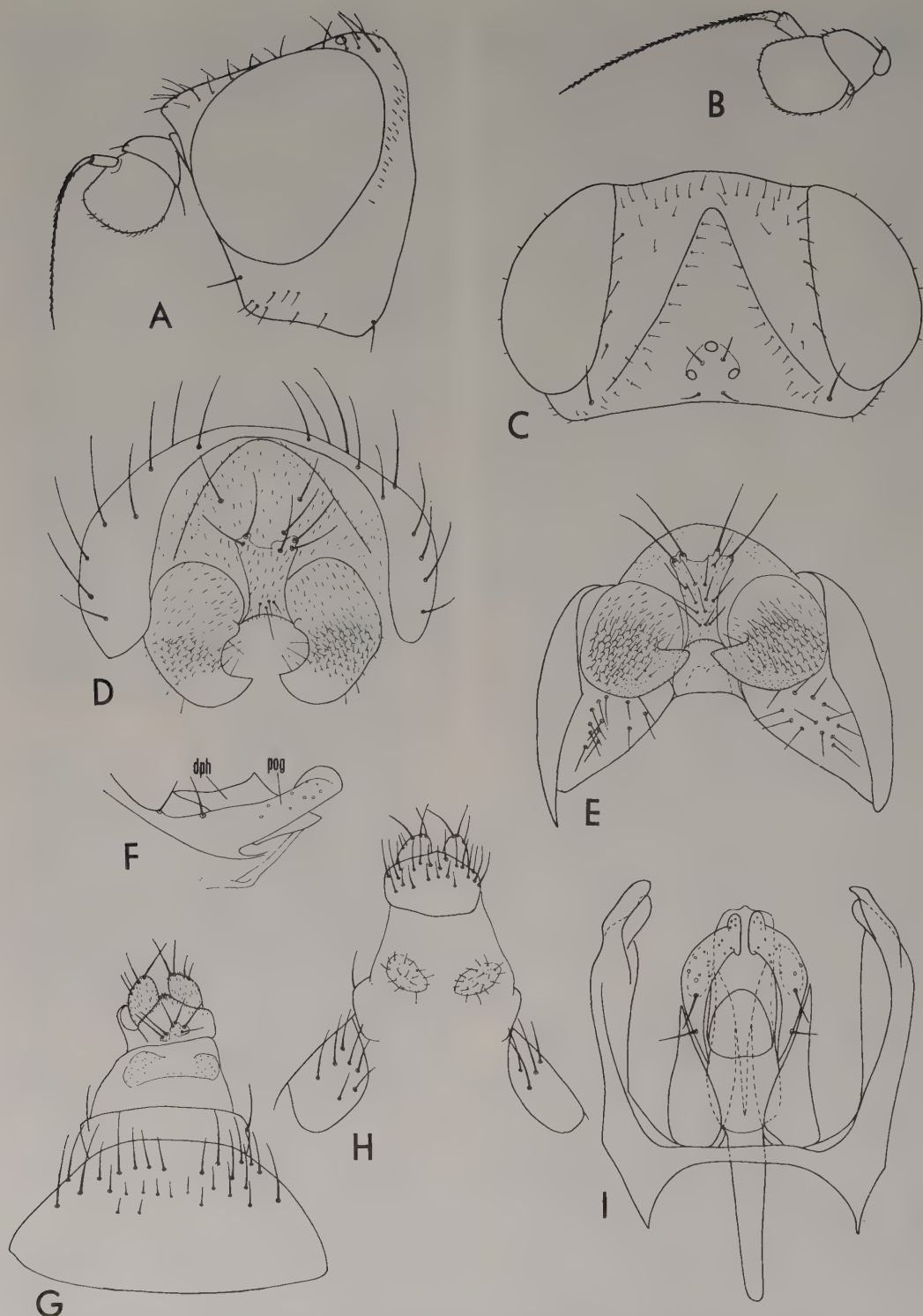


Fig. 67. — A—I. *Meromyzella africana* (Loew). — A. Head, lateral view. — B. Antenna, inner side. — C. Head, dorsal view, antennae omitted. — D. Epandrium, posterior view. — E. Epandrium, ventral view. — F. Phallus and postgonites, lateral view. — G. Ovipositor, dorsal view. — H. Ovipositor, ventral view. — I. Phallic complex, ventral view.

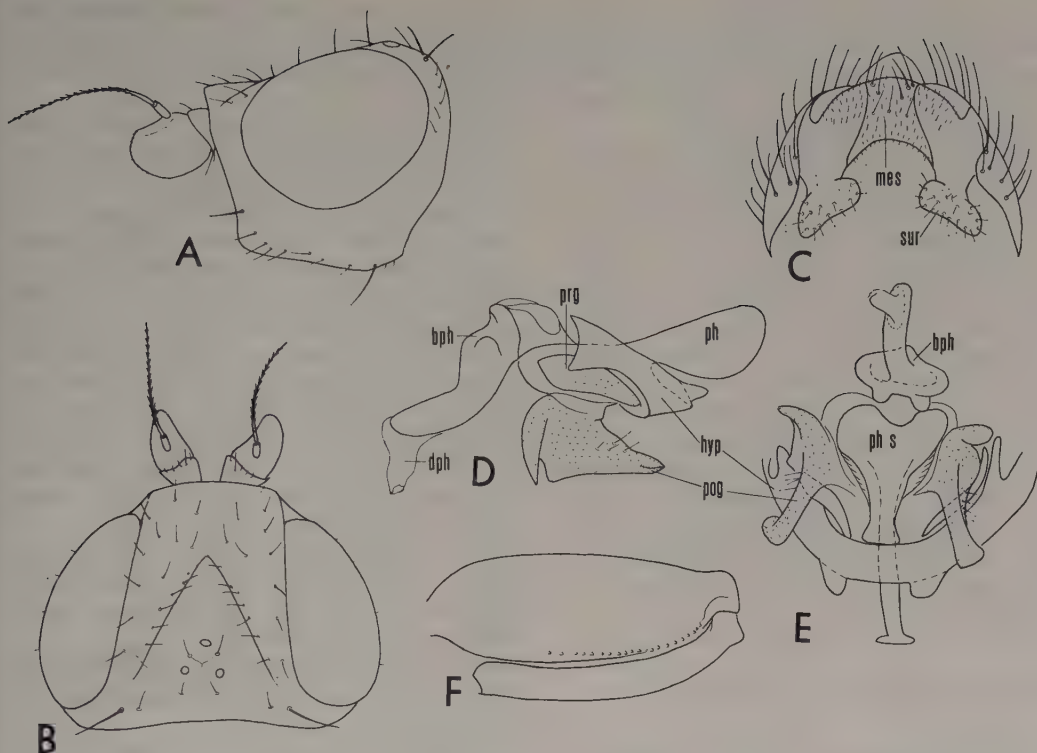


Fig. 68. — A—F. *Meromyza saltatrix* (Linnaeus). — A. Head, lateral view. — B. Head, dorsal view. — C. Epandrium, postero-ventral view. — D. Phallic complex, lateral view. — E. Ditto, ventral view. — F. Hind femur and tibia, antero-lateral view.

and short bristles. Eyes oval with horizontal long axes, sparse short hairs and, in anterior part, larger ommatidia. Jowls broad, usually broader than ant_3 , dusted, usually with one row of pale or dark hairs. vi small, pale or dark. Cheeks broad, sometimes broad as ant_3 . Frons somewhat projecting, longer than broad, subshining with few fr . Frontal triangle rather broad behind, with almost stright side margins reaching $1/2$ or $1/3$ length of frons, usually pale with black ocellar tubercle, smooth or with $\pm$ transverse ridges, shining. if in one row along the margin of the triangle. oc very small, hair-like, procurved and divergent to convergent. pvt short, hair-like, procurved, convergent. vii small, but more bristle-like, procurved. vte still somewhat stronger, outcurved. orb 6—8, recurved. Face concave with indistinct carina. Clypeus small, pale. Proboscis of medium size. Palpi cylindrical or somewhat thickened, pale or black on tip.

Thorax green or yellowish green with black or red stripes and spots. Humerus with dark spot without distinct h . Mesonotum moderately

convex, some species somewhat flattened behind, usually smooth and dusted, sometimes more shining and with coarser, granulated microsculpture, usually 3—5 darker longitudinal stripes, evenly covered by short usually dark hairs. No distinct $a npl$, 1 $p npl$, 1 $a pa$, 1 small $p pa$, 1 dc . Scutellum rounded, flattened, pale, sometimes with dark central stripe, dusted, with few hairs on the disc. $ap sc$ long as half length of scutellum, situated rather close together. 1—2 small $la sc$. Pleura smooth, mostly shining, with dark spots. mpl without hairs. $stpl$ dusted, with few pale hairs.

Legs stout, pale, usually partly darkened. f_3 more or less thickened, ventrally with two rows of black spines. t_3 correspondingly curved. Tibial organ not present.

Wings with r_{2+3} and r_{4+5} strongly procurved. m_{1+2} straight. r_{4+5} and m_{1+2} distinctly divergent.

Abdomen narrow, usually long, pale or darkened, usually with spotted pattern, dusted, with dark and pale hairs. Female cerci long or short. Middle lobe of surstyli more or less

broad, club-shaped or flap-like. Postgonites developed into large shoe-like or hook-like, usually black, appendages. Pregonites lateral of postgonites. Basiphallus long, downcurved. Distiphallus short membranous.

Distribution: Holarctic, South Africa (*Meromyza incompleta* Loew, 1866, from The Cape is a true *Meromyza*, possibly introduced).

Material studied: *Meromyza saltatrix* (Liné); *M. pratorum* Meigen, 1830; *M. curvinervis* (Zetterstedt, 1848); *M. femorata* Macquart, 1835; *M. laeta* Meigen, 1838; *M. nigriventris* Macquart, 1835; *M. variegata* Meigen, 1830; *M. mosquensis* Fedoseeva, 1960; *M. nigriseta* Fedoseeva, 1960; *M. palposa* Fedoseeva, 1960; *M. pluriseta* Péterfi, 1961; *M. sororcula* Fedoseeva, 1962; *M. triangulina* Fedoseeva, 1960.

Remarks. The widely distributed African species *Meromyza capensis* Loew, 1866, is not typical *Meromyza* and has been transferred to *Meromyzella* n. gen. more closely related with *Pachylophus*.

Genus *Pachylophus* Loew, 1858: 121

Figs 69, 116 D.

Type species: *Pachylophus frontalis* Loew, 1858.

Medium size to large, 3—5 mm, red, brown or black, more or less dusted, slender species with thickened hind femora, kidney-shaped ant₃ and thickly pubescent, subterminal arista.

Head longer than high, projecting behind eyes with short bristles. Eyes oval with oblique long axes and sparse short hairs. Jowls broad, at least as broad as length of ant₃, with white dust and numerous pale hairs. vi small, dark. Cheeks distinct. Frons strongly projecting, longer than broad, in front partly shining, with few fr. Frontal triangle large, narrow, behind broad as frons, with basally concave, apically convex, side margins reaching almost to front of frons, shining but dusted along margins, smooth, in middle with some longitudinal ridges. if in one row on the margin of the triangle, incurved. oc short, hair-like, procurved, divergent. vti short, stronger than oc, bristle-like procurved and incurved. vte somewhat smaller, outcurved. orb indistinct, about 8, more or less procurved. Face retreating with shallow carina. Clypeus narrow, proboscis of medium size. Palpi cylindrical. Antennae more or less pale. ant₂ longer than broad, basally with a ventral projection. ant₃ oval, kidney-shaped, higher than long, shortly pubescent. Arista large, thickened black. First segment of

arista short but visible. Second segment very long, long as ant₂, with thick pubescence. Flagellum long, slender with long thick pubescence.

Thorax longer than broad, red-brown with darker markings and short bristles and hairs. Humerus with spot but no distinct h. Mesonotum slightly convex, behind flattened, with indistinct stripes, thickly dusted, with granulate microsculpture, more or less evenly covered with very short, dark hairs. 1 small hair-like a npl, 1 distinct and 1 small p npl, 1 small a pa, 1 small p pa, 1 small dc. Scutellum rounded, flattened, dusted, with some hairs on the disc. ap sc half the length of scutellum, rather close together. No distinct la sc. Pleura smooth. Propleuron and anterior spiracular area shining, pleura otherwise dusted. mpl without hairs. stpl with few pale hairs.

Legs well-developed, f₃ thickened, ventrally with two rows of black spines. t₃ correspondingly curved. t₃ with indistinct area which could be the tibial organ.

Wings of *Platycephala*-type. r₂₊₃ rather short procurved, r₄₊₅ and m₁₊₂ somewhat recurved. Halteres yellow.

Abdomen long and narrow, cylindrical, with dark dusting and very short, dark hairs. Middle lobe of surstyli with large, pointed apex. Postgonites serrated at posterior end, with two long bristles, connected with hypandrium by the long pregonites.

Distribution: Ethiopian, Oriental and Australian Regions.

Material studied: *Pachylophus frontalis* Loew; *P. lugens* Loew, 1860; *P. proximus* Adams, 1905; *P. fossulatus* Adams, 1905; *P. rufescens* (de Meijere, 1904); *P. chinensis* Nartshuk, 1962.

Remarks: The description above is based on the type species *P. frontalis* Lw. However, there is considerable variation in many characters within this species-rich genus. There are almost completely black species with only tarsi yellowish, dark species with yellow legs and head or completely red species. Many species have the head higher than long, not projecting behind the eyes, and with no visible cheeks and with only slightly projecting frons. The frons can be broad as long and the frontal triangle equilateral. The thorax can be shorter and broader with more convex mesonotum, or more extensively shining. The thickness of the hind femora is very different in different species. The apical segment of m₃₊₄ is usually not straight but curved and continuing for a

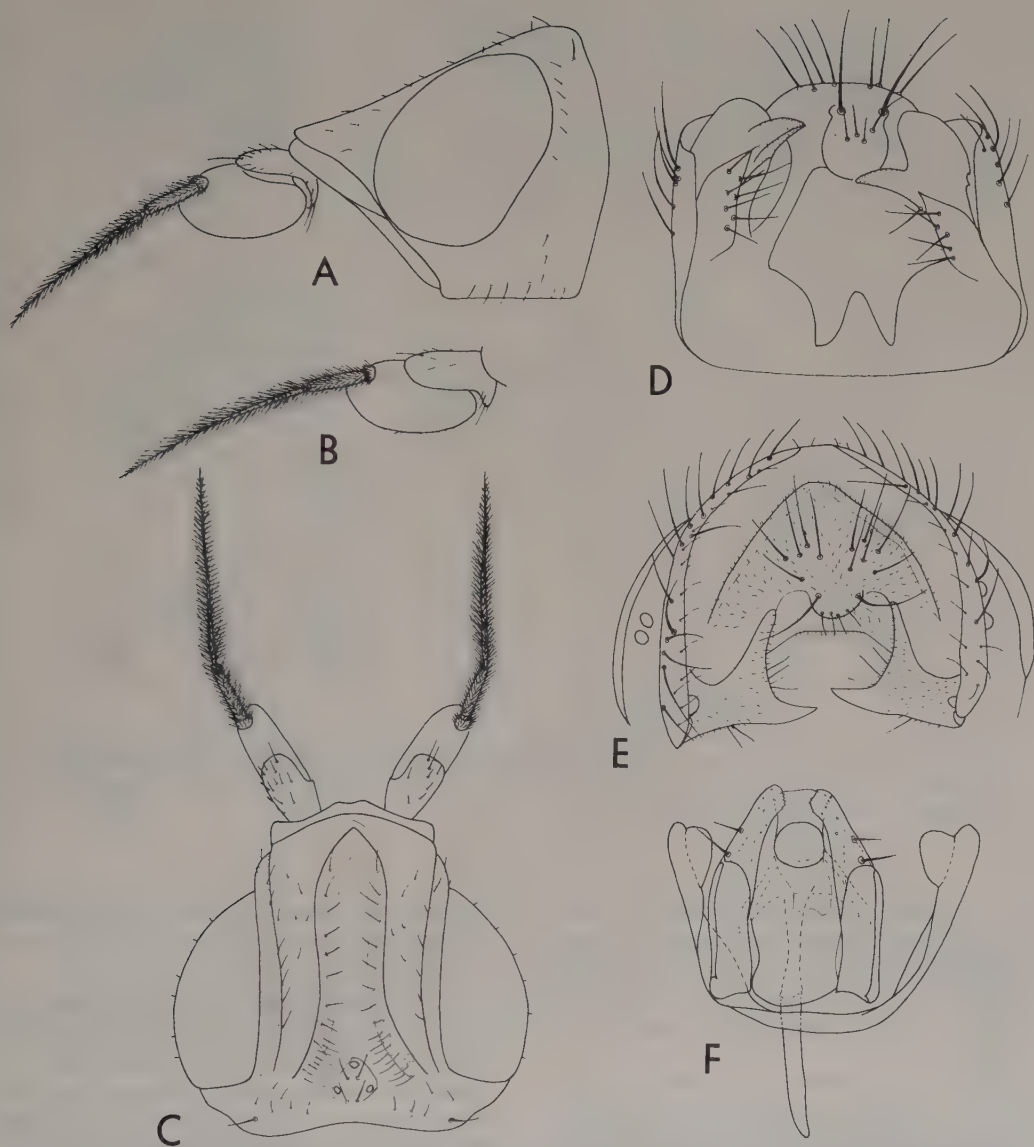


Fig. 69. — A—F. *Pachylophus frontalis* Loew. — A. Head, lateral view. — B. Antenna, from outer side. — C. Head, dorsal view. — D. Epandrium, ventral view. — E. Epandrium, posterior view. — F. Phallic complex, ventral view.

distance parallel with the hind margin of the wing.

Genus **Platycephalisca** Nartshuk, 1959: 472

Fig. 70.

Type species: *Platycephalisca nigra* Nartshuk, 1959.

According to the original description this genus is characterized by long and slender body, strongly projecting frons, long, narrow, smooth,

shining frontal triangle, very well-developed sharp facial carina, trapezoid ant₃, thickened, pubescent, dorsal arista, short hairs and bristles, mpl shining and naked, straight wing veins, and in the male slightly thickened hind femora.

In 1962, Nartshuk described the second species of this genus, *P. amurensis* Nartshuk and figured the male genitalia. The epandrium (fig. 70, D) is remarkable. Nartshuk interpreted appendage x as the cercus, appendage y as the surstylus. The first-mentioned is surely

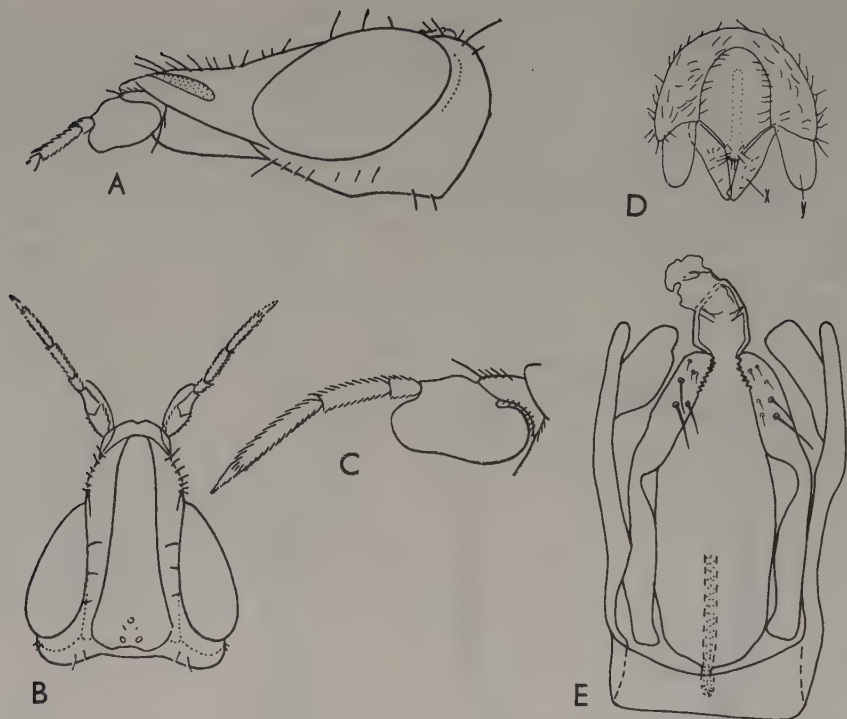


Fig. 70. — A—C. *Platycephalisca nigra* Nartshuk. — A. Head, lateral view. — B. Head, dorsal view. — C. Antenna. — D—E. *Platycephalisca amurensis* Nartshuk. — D. Epandrium, posterior view. — E. Phallic complex, ventral view. From Nartshuk 1959, 1963. According to Nartshuk: x = cercus, y = surstylus.

not the cercus. In Chloropinae there are never discrete, paired cerci but only a simple, median mesolobus which can also be seen in Nartshuk's figure. Whether structure x or y is the surstylus cannot be ascertained from the description.

Platycephalisca seems to be closest to *Pachylophus* which has a kidney-shaped ant₃ with terminal arista, an indistinct facial carina, and thickened hind femora. Most *Pachylophus* species have shorter head and short triangular frontal triangle and very stout hind femora, but there are African species that have long head, long frontal triangle and very slightly thickened hind femora. The postgonites are rather similar with serrate posterior end and long bristles. The epandrium is more different.

Distribution: Central and Eastern Palaearctic.

Genus *Platycephala* Fallén, 1820: 2

Figs 71, 72, 116 C.

Type species: *Musca planifrons* Fabricius, 1798 (as *Platycephala culmorum* Fallén, 1820).

Synonymy: *Phylarus* Gistel, 1848: 10, type species, *Musca planifrons* Fabricius, 1798 (Sabrosky 1941).

Large, 6—8 mm, narrow, brown or ochrous species with prolonged antennae and extensively haired frontal triangle, mpl and stpl.

Head longer than high, in upper part prolonged anterior of eyes for at least half length of eyes with face sloping backwards so that the vibrissal angle is approximately below fore margin of eyes. Eyes oval with horizontal long axes, naked or with sparse short hairs. Jowls very broad, shining, wrinkled, with few pale hairs. vi short, pale. Cheeks distinct. Frons strongly projecting, longer than broad almost completely covered by the large frontal triangle, dusted. fr few or none. Frontal triangle behind broad as frons, with straight or slightly concave thereafter convex side-margins broadly reaching front of frons, with half-circular fore margin and covered by numerous hair-like if all over the surface, except on a central stripe, shining smooth or with transversely undulating surface or with larger uncoloured or small,

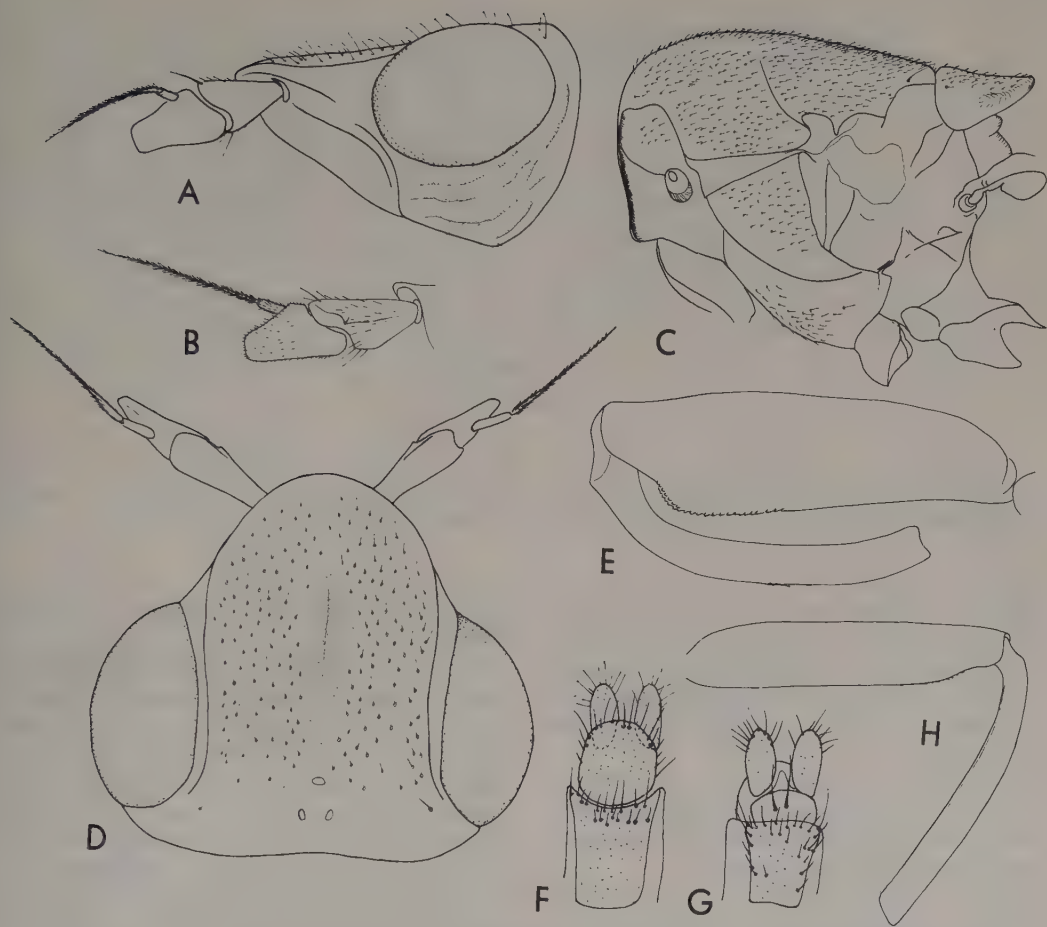


Fig. 71. — A—G. *Platycephala planifrons* (Fabricius). — A. Head, lateral view. — B. Antenna, inner side. — C. Thorax, lateral view. — D. Head, dorsal view. — E. Hind femur and tibia, anterior view. — F. Apex of ovipositor, ventral view. — G. Ditto, dorsal view. — H. *Platycephala rugosa* (Nartshuk), hind femur and tibia, anterior view.

dark punctures at base of *if*. *oc* absent. *pvt* absent or very small, procurved, convergent. *vti* indistinct. *vte* short, outcurved. 8—10 short, recurved *orb*. Face dusted, sloping, more or less keel-shaped, without distinct carina. Clypeus dark or pale, mostly shining. Proboscis normal or a little prolonged. Palpi short, narrow, cylindrical. Antennae prolonged, partly darkened. *ant*₂ above about 2—3 times as long as broad. *ant*₃ prolonged, usually rectangular, sometimes narrower in apical half, 2—4 times as long as broad, pubescent. Arista with long stout yellow basal segments and white, slender, pubescent flagellum.

Thorax. Humerus with dark spot, with or without dark puncture at base of hairs, with or without small *h*. Mesonotum flat, shining,

brown or yellowish brown, with 3—5 darker brown or red stripes, covered by numerous short dark and pale hairs, less numerous along *dc* lines and in most species, at least on the darker stripes, arising from distinctly darker punctures. Thoracic bristles short. 0—1 *a npl*, 1 *npl*, 1 *a pa*, 0—1 *p pa*, 0—1 *dc*. In the same species *a npl*, *p pa*, and *dc* are usually all missing or all present. Scutellum oval, flat, shining, with numerous hairs arising from punctures. Distinct *ap sc* present or absent. 1—2 distinct *la sc* present or absent. Pleura shining. *mpl* and *stpl* extensively hairy, hairs arising from punctures, dark or not.

Legs. Fore and middle legs simple or with slightly thickened femora. *t*₂ with 1—3 dark apical spurs. *f*₃ slender and simple, broader

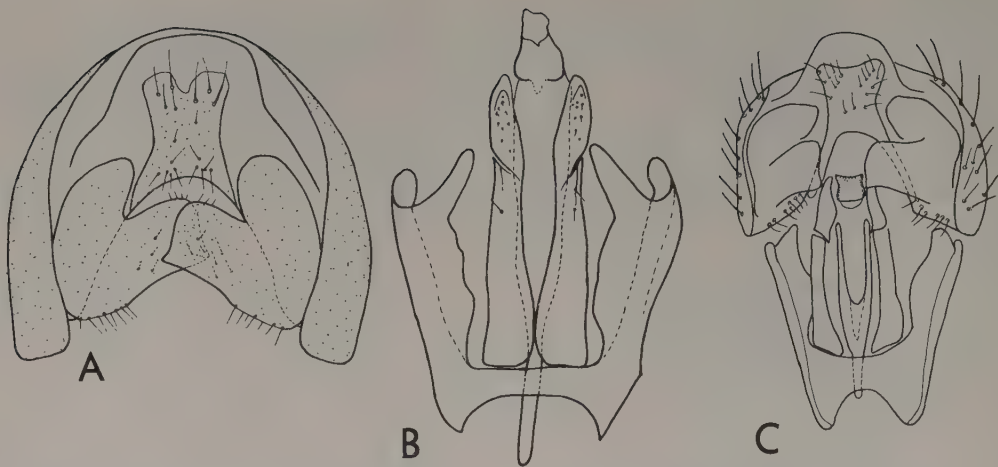


Fig. 72. — A—B. *Platycephala planifrons* (Fabricius) male genitalia, ventral view. — C. *Platycephala rugosa* (Nartshuk), male genitalia, from Nartshuk, 1964, redrawn.

with some granulae below or very thickened with a ridge below in apical half covered with many granulae. t_3 almost straight and simple or curved when f_3 is thickened and in latter case with a sclerotized ventral ridge. Tibial organ absent.

Wings of Chloropinae-type, more or less brownish with thick veins. Costa, r_1 and m_{1+2} yellow, other veins dark brown in species with brownish wings. Halteres yellow.

Abdomen long, parallel-sided, brown, dusted with pale or dark hairs. Sternites largely reduced. Female cerci short. Middle lobe of surstylus flat, squarish. Postgonites short, fused with the long slender pregonites.

Distribution: Palaearctic Region.

Material studied: *Platycephala planifrons* (Fabricius); *P. umbraculata* (Fabricius, 1794); *P. scapularum* (Becker, 1907) (*Eurina* s.) (syn.: *P. algerica* Duda, 1933, n. syn. [*P. planifrons* var. *algerica* Duda, 1933]; *Eurina luteola* Collin, 1949, n. syn. [*Eurina scapularum luteola* var. n. vel sp. n.]); *P. rugosa* (Nartshuk, 1964), n. comb. (*Eurina* r.).

Genus *Eurina* Meigen, 1830: 3

Fig. 73.

Type species: *Eurina lurida* Meigen, 1830.

Synonymy: *Polydecta* Gistel, 1848: 9, type species: *Eurina lurida* Meigen, 1830; *Eurhina* Westwood, 1840: 147 (emendation) Sabrosky 1941).

Medium to large, 3—8 mm, predominantly brown, rather long species with strongly pro-

jecting forehead, simple f_3 and extensively hairy pleura.

Head longer than high with frons projecting about as long as eyes, face retreating, vibrissal angle therefore below fore margin of eyes. Eyes small, rounded or slightly oval with horizontal long axes and sparse short hairs. Jowls broad to very broad, up to as broad as height of eye, wrinkled behind, dusted, with few pale hairs all over. *vi* indistinct, pale. Cheeks well developed. Frons very strongly projecting, long as broad, dusted, with few *fr*. Frontal triangle large, behind usually almost as broad as frons, with straight side margins reaching front of frons, brownish, with longitudinal median groove, dusted, especially along sides, *if* numerous all over the surface, arising from distinct punctures. *oc* and vertical bristles very short. *oc* small, hair-like, procurved. *pvt* indistinct. *vti* indistinct, *vte* small, outcurved. *orb* numerous, indistinct, recurved. Face dusted with indistinct carina. Clypeus large, pale, dusted. Proboscis medium size, palpi short, sometimes clavate, with sensory groove. Antennae prolonged, yellow to brown, apically darkened. ant_2 at least 1.5 times as long as broad. ant_3 , trapezoid, somewhat longer than broad, pubescent. Arista rather thick at base, dark, shortly pubescent.

Thorax yellowish to brown with darker spots and stripes, dusted, with short hairs. Humerus with dark spot and without distinct *h*. Mesonotum flattened, evenly covered with short dark or pale hairs arising from distinct, shining, dark punctures. 1 *a npl*, 1 or 2 *p npl*, 1 *a pa*,

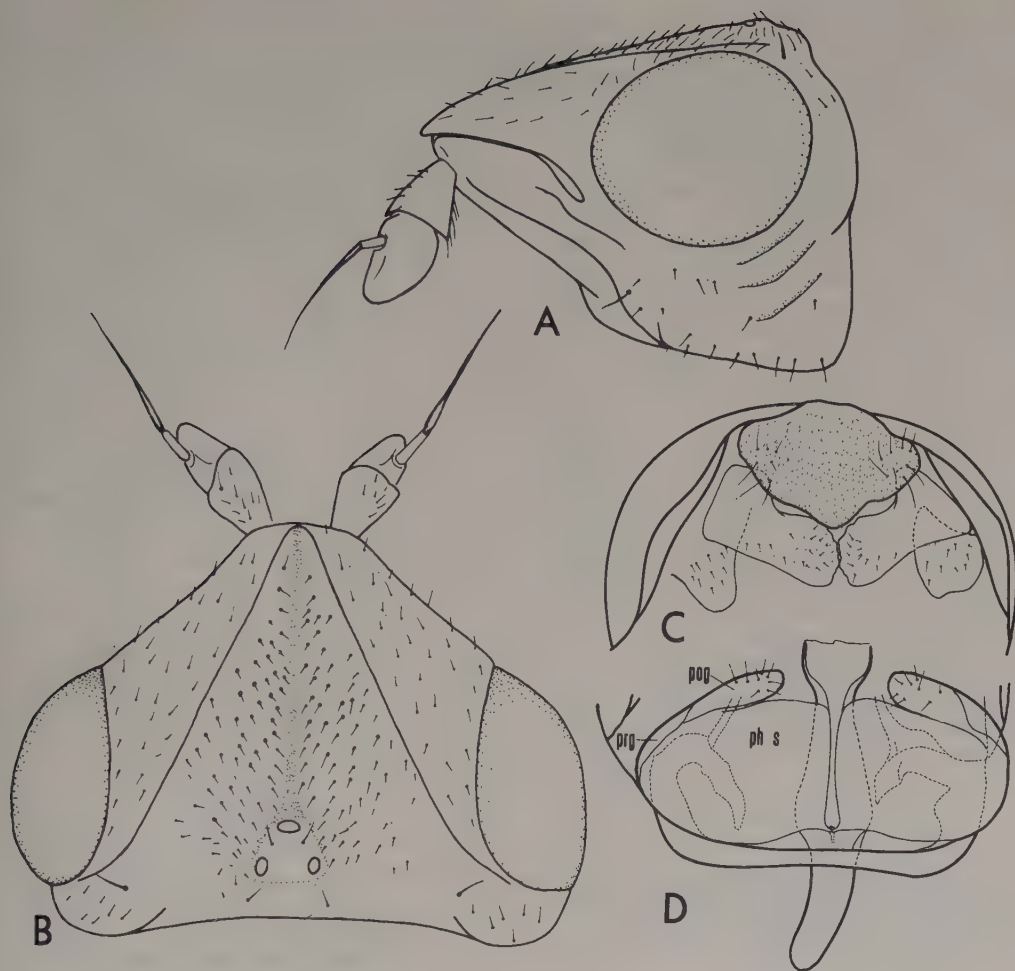


Fig. 73. — A—D. *Eurina calva* Eggers. — A. Head, lateral view. — B. Head, dorsal view. — C. Epandrium, posterior view. — D. Phallic complex, ventral view.

1 indistinct *p pa*, 1 *dc*. Scutellum rounded, flat, dusted, with numerous hairs arising from punctures, *ap sc* short, 2—3 *la sc*. Pleura dusted, *mpl*, *stpl* and *ptpl* with numerous dark or pale hairs.

Legs simple, slender. *t*₂ with 1—2 dark spurs ventrally. *f*₃ slender, simple. Tibial organ not present.

Wings more or less darkened, with thick, dark veins. Halteres yellow.

Abdomen long, brownish, dusted above, with dark or pale hairs.

Material studied: *Eurina calva* Eggers, 1862.

Remarks: Many rather different species have been described as belonging to *Eurina*. All of them have in common a greatly prolonged frons, slender *f*₃ and at least somewhat pro-

longed antennae. *Eurina scapularum* Becker, 1907, *Eurina luteola* Collin, 1949, and *Eurina rugosa* Nartshuk, 1964, have been transferred to *Platycephala* Fallén on basis of the structure of the frontal triangle and hind legs. *Eurina calva* Egg. seems to be close to *lurida* Meig., mainly differing in its very heavy dusting. The male genitalia of *calva* Egg. differ markedly from those of *Platycephala* species in having the pregonites, postgonites, phallapodeme and phallapodemic selerite fused into a very broad, disc-like structure and lack a distinct movable phallus. Provided that *lurida* Meig. has a similar structure I think the genus *Eurina* is well-defined. *Eurina palpata* Nartshuk, 1973, is smooth, shining with very long palpi and has male genitalia close to those of *Platycephala*

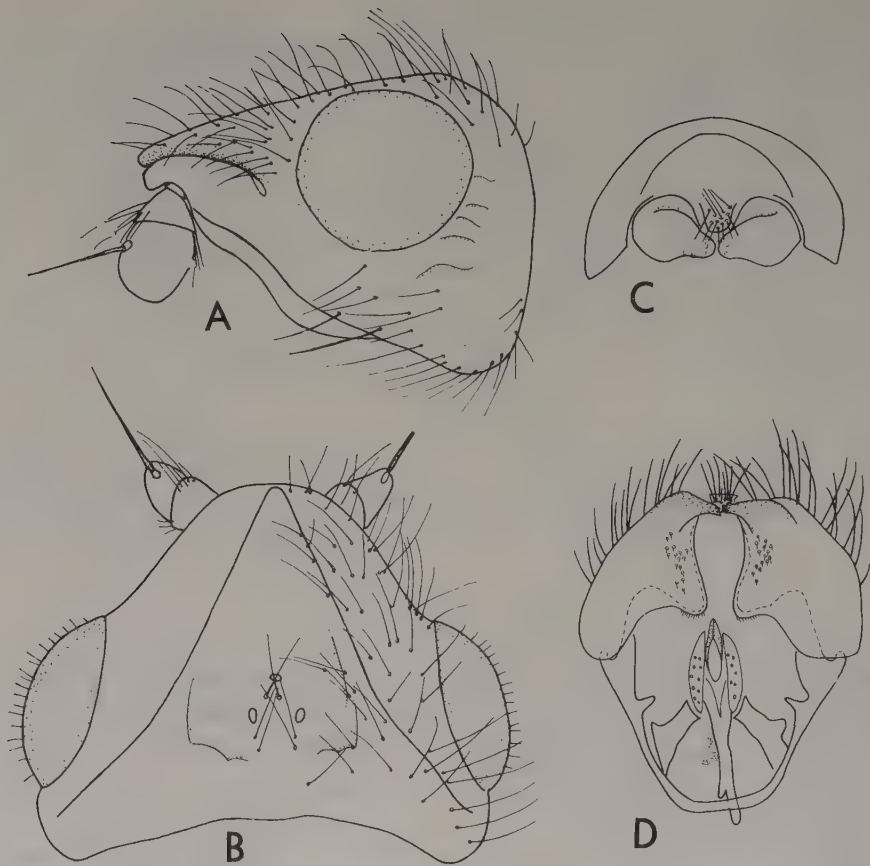


Fig. 74. — A—D. *Trichieurina pubescens* (Meigen). — A. Head, lateral view. — B. Head, dorsal view. — C. Epandrium, posterior view. — D. Male genitalia, ventral view. — C, D after Nartshuk, 1966, redrawn.

but differs from that genus in having a triangular, largely naked frontal triangle. Comparing microsculpture, dusting, palpi and male genitalia it seems difficult to include *palpata* and *calva* in the same genus. *Eurina minuta* Loew, 1860, differs from *lurida* and *calva* in having such characters as shining, naked pleura, shining naked frontal triangle with *if* in one row along the margin of the triangle, and distinct, bristle-like, but sometimes short, *oc*, *pvt*, *vti*, *vte*, *h*, 2 *p npl*, 1 *p pa*. The assignment to genus of these species cannot be made until males of *lurida* and *minuta* are available for dissection.

Genus ***Trichieurina*** Duda, 1933: 126

Fig. 74.

Type species: *Eurina pubescens* Meigen, 1830.

Medium size, 3—5 mm, brown species, with strongly projecting frons and covered with very thick brown and grey dust and extremely long slender hairs.

Head brown, longer than high, in side view triangular due to the projecting frons and retreating face. Eyes small, rounded oval with horizontal long axes and sparse, long hairs. Jowls very broad, behind broad as height of eyes, coarsely wrinkled, smooth in anterior two thirds, with grey dust and long dark or pale hairs spread all over. *vi* indistinct. Cheeks broad. Frons projecting beyond eyes as long as length of eyes, broader than long, with triangular fore margin, heavy grey dust and long *fr*. Frontal triangle large, behind broad as half width of frons, with straight side margins reaching front of frons, brown, covered by very heavy brown and grey dust, smooth, with a longitudinal median groove. *if* in one row on

margin of the triangle, long, hair-like, irregularly incurved. *oc* and vertical bristles long and slender as are the other extremely long hairs on the head. *oc* procurved, divergent. *pvt* procurved, convergent. *vte* and *vti* indistinct. *orb* about six, long, more or less outcurved. Face sloping, dusted, with distinct, rather narrow, carina. Clypeus large, dark, dusted. Proboscis short. Palpi short and somewhat clavate. Antennae brown, somewhat prolonged. *ant*₂ large, about as long as broad. *ant*₃ squarish, somewhat longer than broad. Arista almost naked, dark on basal segments, flagellum white.

Thorax probably dark brown but completely covered with very thick grey or brown dust, bristles indistinct and similar to the numerous extremely long hairs that are present on most parts. Humeri with long hairs, *h* not distinct. Mesonotum moderately convex, smooth, covered with grey, along a double central line brown, thick dust and evenly covered with long dark hairs. *npl* with a group of some hairs but with no distinct bristle. *a pa* and *p pa* indistinct. *dc* somewhat longer than the other hairs. Scutellum rounded, convex, dusted brown in middle, grey at sides, with long hairs. *ap sc* long, hair-like. About 3–4, hair-like *la sc*. Pleura completely dusted. *mpl*, *ptpl* without hairs. *stpl* covered with long dark or pale hairs.

Legs simple, covered with thick, grey dust. *t*₂ without distinct ventral spur. *f*₃ slender. Tibial organ not present.

Wings of Chloropinae-type, brownish with very thick, dark brown veins. Halteres dark.

Abdomen oval, dorsally covered with thick, dark brown dust, at sides and below with thick, grey dust, and with long dark hairs. Female cerci short. Male genitalia, according to Nartshuk (1966) rather similar to those of *Platycephala* but with serrate middle lobe of surstyli, short postgonites and shorter, more transversely directed pregonites.

Distribution: Europe, Central Asia.

Material studied: *Trichieurina pubescens* (Meigen).

Genus *Camarota* Meigen, 1830: 7

Fig. 75.

Type species: *Oscinis curvipennis* Latreille, 1805 (as *Camarota flavitarsis* Meigen, 1830).

Small, 2–3 mm, black species with yellowish head and legs, thick, black arista, large frontal triangle and wings with *r*₂₊₃ fused with *r*₁ and costa.

Head longer than high, white to yellowish brown, with very short bristles. Eyes long, oval, with horizontal long axes, sparse short hairs and anterior ommatidia larger than the posterior ones. Jowls broad, in front broad as *ant*₃, behind broader and wrinkled, with white dust and some pale hairs. *vi* short, pale. Cheeks broad with a black spot. Frons distinctly projecting, longer than broad, without *fr*. Frontal triangle large, behind broad as width of frons with somewhat concave side margins broadly reaching front of frons, smooth, shining, with a shallow depression forming a large triangular flat area in front of the ocellar tubercle. *if* in one row on the disc of the frontal triangle incurved and procurved. *oc* short, procurved and divergent. Vertical bristles indistinct. 7–9 small, procurved and incurved *orb*. Face receding, with distinct, narrow carina. Clypeus pale, shining. Proboscis short. Palpi short, cylindrical, yellow. Antennae yellow and black. *ant*₂ short. *ant*₃ trapezoid, in front narrower than at base, pubescent. Arista black, broad, lanceolate with short pubescence.

Thorax black, short and broad with short bristles. Humerus without distinct *h*. Mesonotum flat, shining, with coarse microsculpture due to more or less stellate granulae which bear the evenly dispersed very numerous, short, pale hairs covering the mesonotum. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 small *p pa*, 1 *dc*. Scutellum rounded, broader than long, flat, with thin hind margin, shining black, with coarse microsculpture, dusted at sides, with numerous, pale hairs. *ap sc* short, upright, convergent, situated on the middle of the disc. Pleura mostly dusted and smooth. *mpl* with a shining, wrinkled area below, otherwise dusted with numerous, pale hairs. Spiracular callus shining. *stpl* shining at middle and in front below otherwise silvery dusted, with few short hairs.

Legs rather stout, simple. Narrow tibial organ present.

Wings brownish with thick brown veins. *r*₂₊₃ fused with *r*₁ and c. *r*₄₊₅ short, procurved. Halteres black.

Abdomen oval, black, dusted above, with short, dark hairs. Middle lobe of surstylus with long, hook-like apical end. Postgonites and pregonites short. Distiphallus short. Hypandrium with very broad arch.

Distribution: Europe, Africa.

Material studied: *Camarota curvipennis* (Latreille).

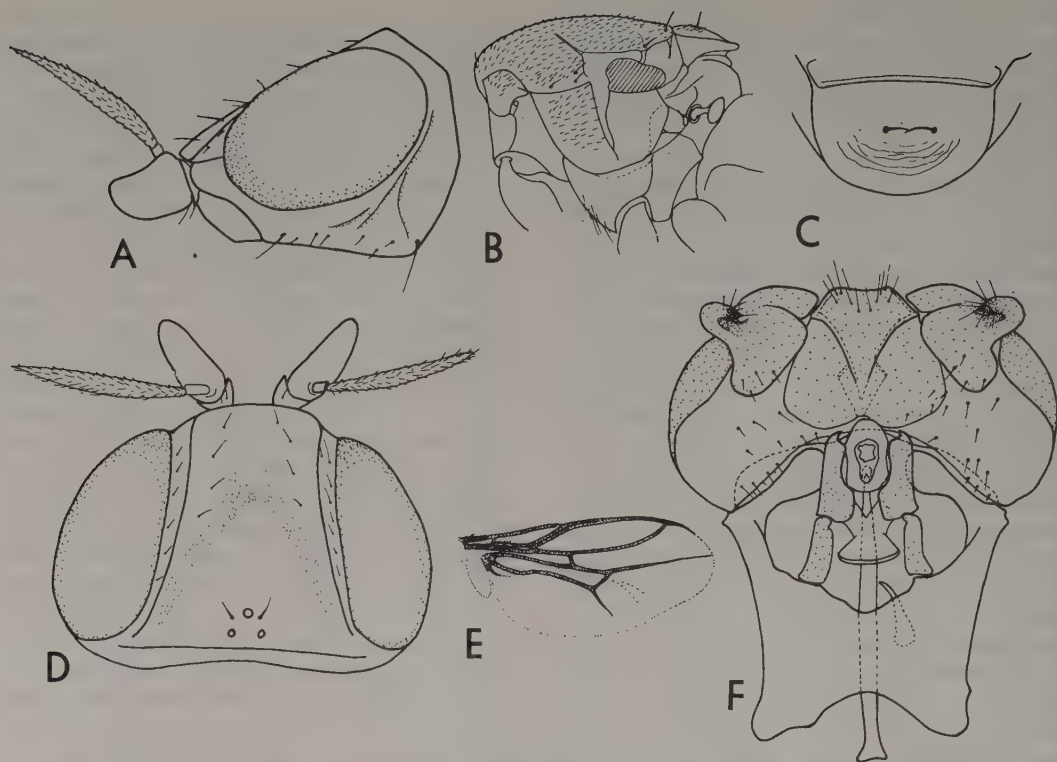


Fig. 75. — A—F. *Camarota curvipennis* (Latreille). — A. Head, lateral view. — B. Thorax, lateral view. — C. Scutellum, dorsal view. — D. Head, dorsal view. — E. Wing. — F. Male genitalia, ventral view.

The *Mepachymerus* genus group

The *Mepachymerus* genus group is characterized by slender body shape, long legs, long, narrow wings, two stronger *orb*, kidney-shaped *ant*₃ and terminal, very broad arista with short basal segments.

Sabrosky (1951) has discussed the taxonomy of *Mepachymerus* s. lat. and the possible grouping of the African species. Frey (1961) proposed the subgenus name *Steleocerellus* Frey for Sabrosky's *tenellus* group. Sabrosky treated the variation of the *orb*, the *p npl* and the length of legs and pointed out that there are more or less distinct intermediate forms between typical *Mepachymerus* species and typical *tenellus* group species. The *tenellus* group, as represented by *S. ensifer* (Thomson), undoubtedly is close to *Mepachymerus*. However, the differences between the two taxa are so large as to rectify the recognition of *Steleocerellus* as a genus. The main differences are that in *Mepachymerus* the thoracic bristles are strongly reduced, the thorax completely dusted,

the legs very long and slender with laterally compressed fore tarsi, segment 6—7 in the female abdomen are large and not retractible with large tergites, the postgonites and pregonites discrete and the phallus short and straight. In *Steleocerellus* the thoracic bristles are well developed, with at least pleura shining, the fore legs simple, ovipositor normally developed and completely retractible, the postgonites, pregonites and phallapodemic sclerite fused and the phallus long and curved.

The oriental species related to *Steleocerus formosus* Becker are substantially different from *Mepachymerus* and are more closely related to *Formosina* et al. They are here treated under the genus *Ensiferella*.

Genus *Mepachymerus* Speiser, 1910: 197

Figs 76, 116 G.

Type species: *Mepachymerus bauculus* Speiser, 1910.

Synonymy: *Steleocerus* Becker, 1910: 399, type species: *Steleocerus lepidopus* Becker, 1910 (Sabrosky 1951, 1964).

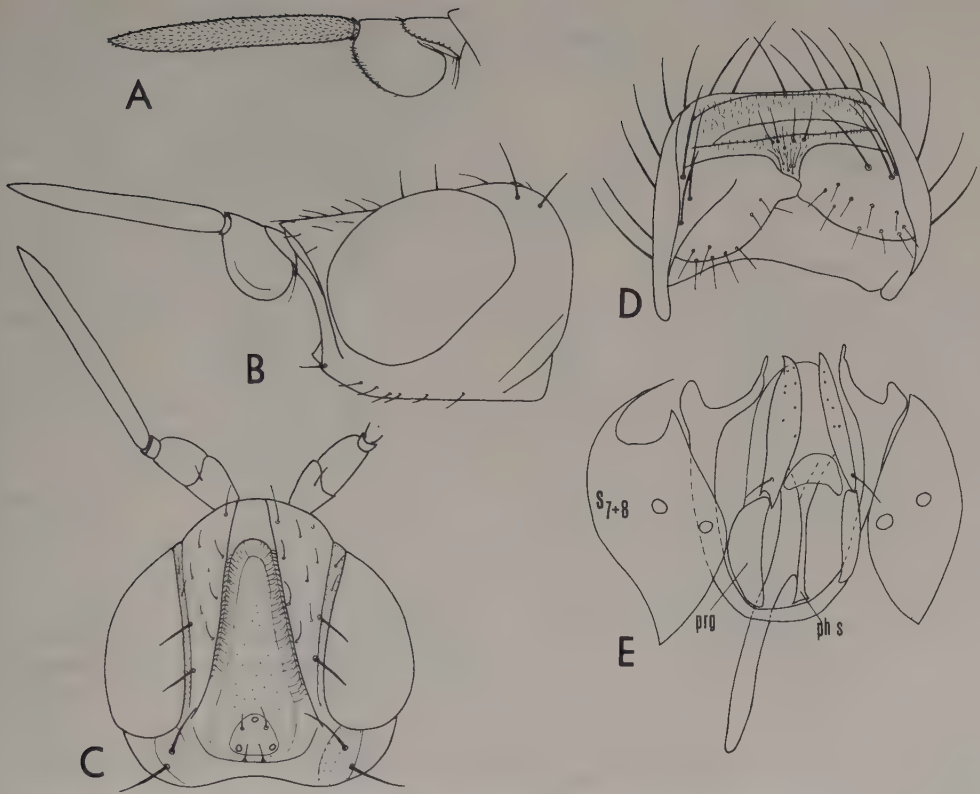


Fig. 76. — A—E. *Mepachymerus bauculus* Speiser. — A. Antenna, outer side. — B. Head, lateral view. — C. Head, dorsal view. — D. Epandrium, ventral view. — E. Phallic complex and sternite 7+8, ventral view.

Medium to large size, 3—5 mm, slender species with long legs and wings, kidney-shaped ant₃ and thickened arista.

Head in side view squarish, longer than high, posteriorly swollen and projecting beyond eyes, black, with very short bristles. Eyes squarish oval with oblique long axes. Jowls narrow, about as broad as base of t₁, with silvery-white pubescence and few pale hairs. vi small, slender, dark. Cheeks linear. Frons somewhat projecting, longer than broad, shining in anterior half, with silvery pubescence along eyes, and with few fr. Frontal triangle large, long and slender, behind broad as frons, with concave side margins reaching front of frons, shining at sides, depressed and dusted on the disc. if short, along the margin of the triangle, procurved. oc very short and slender, procurved, divergent. pvt still shorter, procurved and somewhat convergent. vii at least twice as long as oc and much stouter, incurved and procurved. vte somewhat shorter than vii,

upright to outcurved. Two distinct, recurved orb. Face somewhat concave with narrow, low carina in upper half. Epistoma distinct. Clypeus very large, black, shining. Proboscis of medium size. Palpi cylindrical, dark. Antennae yellowish. ant₂ small, longer above than below. ant₃ oblique, kidney-shaped. Arista situated at tip of ant₃, basal segments very short, flagellum long and very broad with short pubescence.

Thorax very long and narrow, black, completely heavily dusted, with few very short hairs. Humerus without distinct h. Mesonotum flattened behind, smooth, heavily dusted in brown and grey, with few very short hairs. a npl lacking, 1 distinct, strong p npl, 1 short a pa, no p pa, 1 very small, hair-like dc. Scutellum, rounded, flattened, dusted, with few hairs. ap sc about 2/3 length of scutellum. 1—2 small la sc. Pleura smooth. mpl naked. stpl with few hairs.

Legs very long and slender, yellowish to black. t₁ black. Fore tarsi in both ♂ and ♀

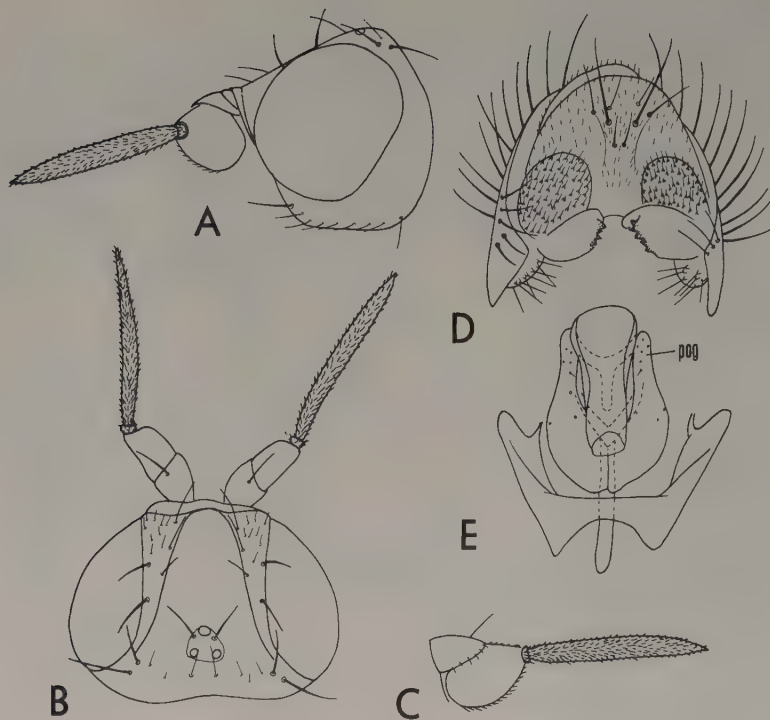


Fig. 77. — A—E. *Steleocerellus ensifer* (Thomson). — A. Head, lateral view. — B. Head, dorsal view. — C. Antenna, inner side. — D. Epandrium, posterior view. — E. Phallic complex, ventral view.

prolonged, laterally flattened, black. No tibial organ.

Wings very long and narrow, brownish, with very long discal cell. Halteres white.

Abdomen long and slender, dark, dusted, with few short, dark hairs. Tergites 7—8 in female very large, laterally compressed, not retractible. Cerci slender, shining. Middle lobe of surstylus with pointed apex. Postgonites and pregonites narrow, discrete. Phallapodemic sclerite very narrow. Phallus short and straight.

Distribution: Africa.

Material studied: *Mepachymerus bauculus* Speiser.

Genus *Steleocerellus* Frey, 1961: 35

Figs 77, 116 H.

Type species: *Steleocercus tenellus* Becker, 1910: 401.

Small to medium size, 2—3 mm, yellowish to brownish-black species with terminal, strongly thickened arista, and kidney-shaped ant₃.

Head mainly higher than long with dark bristles and partly pale hairs. Eyes large, rounded oval with oblique long axes, naked. Jowls narrower than ant₃ with one row of hairs. vi distinct. Vibrissal angle not projecting. Cheeks not visible. Frons slightly projecting, longer than broad, with very few fr. Frontal triangle behind almost as broad as frons, with straight or slightly convex or concave side margins reaching front of frons, either pointed or rounded off, smooth, shining, yellow or more or less brownish. if long, outside the margin of the triangle, procurved and incurved. oc distinct, procurved, divergent. pvt short and indistinct, procurved, subparallel. vte long as oc, outcurved. vti long, incurved. 2 distinct, recurved orb. Face concave. Facial carina short and indistinct. Clypeus yellow or black. Proboscis short. Antennae yellow or darkened, with terminal, black arista. ant₂ dorsally somewhat prolonged. ant₃ obliquely oval, higher than long, pubescent. Basal segments of arista short. Flagellum long, broad, sword-shaped, with short pubescence.

Thorax longer than broad, narrower than

the head, yellow with darker spots or stripes. Humerus with indistinct spot and 1 *h*. Mesonotum moderately convex, smooth, dusted, at least behind, evenly covered with short, dark hairs, black or yellow with more or less confluent brown to black longitudinal stripes. Thoracic bristles well developed, dark. 1 *a npl*, 1—2 *p npl*, 1 *a pa*, 1 *p pa*, 1 strong *dc*. Scutellum rounded, convex, smooth, dusted, with a few discal hairs. *ap sc* longer than scutellum, not close together. 1 shorter *la sc*. Pleura smooth, shining. *mpl* without hairs. *stpl* with a few pale hairs and black spot.

Legs slender, simple, yellow or more or less brownish. Tibial organ long and narrow.

Wings rather long and narrow. t_a opposite tip of r_1 . r_{2+3} often rather short so that mg_2 is slightly longer than mg_3 . Halteres white or yellowish.

Abdomen narrow oval, brownish, dusted with short hairs. Ovipositor normal with short cerci. Surstyli with broad, serrate middle lobe and distinct dorsal lobe. Distiphallus long and downcurved. Postgonites narrow fused with the broader pregonites and the phallapodemis selerite.

Distribution: Ethiopian and Oriental Regions.

Material studied: *Steleocerellus ensifer* Thomson, 1868. *Steleocerellus spp.* (two unidentified species from Sri Lanka).

The *Semaranga* genus group

The *Semaranga* genus group is characterized by kidney-shaped ant_3 , subapical to apical, broad, flattened, pubescent arista with basal segments well-developed, large, shining, smooth, triangular frontal triangle, procurved *orb* and wings resembling the *Diptoxa*-type with approximated cross-veins and short discal cell, but without procurved r_{2+3} and r_{4+5} . The large differences in the frontal triangle, *orb*, antennae and male genitalia exclude any closer relationship between *Semaranga* Becker and *Diptoxa*. Genera of the *Mepachymerus* and *Loxotaenia* genus groups (*Mepachymerus*, *Steleocerellus*, *Ensiferella*) have antennae similar to those of *Semaranga*. The differences in the *orb*, male genitalia and wings speaks against any closer relationship between these taxa.

Sabrosky (1951) has pointed out the similarities between *Semaranga* and *Elachiptereicus* Becker. I think the differences in the arrangement of *if* and the number of *dc* are important

enough to rectify the preservation of the genera as separate.

Genus *Semaranga* Becker, 1911: 48

Figs 78, 116 I.

Type species: *Semaranga dorsocentralis* Becker, 1911.

Small species, 2—3 mm, shining, yellow with three pairs of long straight *dc*, kidney-shaped ant_3 and long, thick, pubescent, black arista.

Head higher than long with distinct dark bristles. Jowls broad, broader than ant_3 , wrinkled, with pale or dark hairs in lower third. *vi* distinct. Cheeks very narrow or invisible in side view. Frons somewhat projecting, longer than broad, not dusted, with few *fr*. Frontal triangle large, behind broad as frons, with straight side margins reaching front of frons, smooth, shining, yellow with dark ocellar tubercle. *if* in one row along the margin of triangle, procurved. *oc*, *vii*, *vte* subequal, long and rather straight. *oc* divergent. *pvt* short, long as $1/2$ *vii*, procurved, slightly divergent. *vii* directed inwards. *vte* directed outwards and backwards. *orb* about 5 indistinct, more or less procurved. Eyes small, broad oval with oblique long axes, with sparse short hairs. Face rather flat, sloping without distinct carina. Clypeus pale, shining. Proboscis short. Palpi short, cylindrical, pale. Antennae yellowish. ant_2 small, longer than broad. ant_3 kidney-shaped, higher than long. Arista at apex of ant_3 , black, thickened, with dense pubescence. First basal segment of arista large, long as broad, pubescent. Second segment long, about twice as long as broad. Flagellum relatively short, about 1.5 times as long as the basal segments together.

Thorax yellow, shining, smooth, with few brownish spots and strong, straight, black bristles. Humerus with dark spot, without *h*. Mesonotum moderately convex, somewhat flattened behind, with scattered short, brownish hairs. 1 *a npl*, 2 *p npl*, 1 *a pa*, *p pa* absent, 3 strong, straight *dc*. Scutellum rounded, weakly convex, shining, with few hairs. *ap sc* long and straight, long as scutellum, rather close together, 1 weaker *la sc*. Pleura without hairs and spots.

Legs slender, simple, pale. Tibial organ indistinct, narrow.

Wings with r_{2+3} and r_{4+5} straight and t_a and t_p close together. Halteres yellow.

Abdomen yellow, dusted, with dark hairs, oval. Middle lobe of surstylus large with bifid

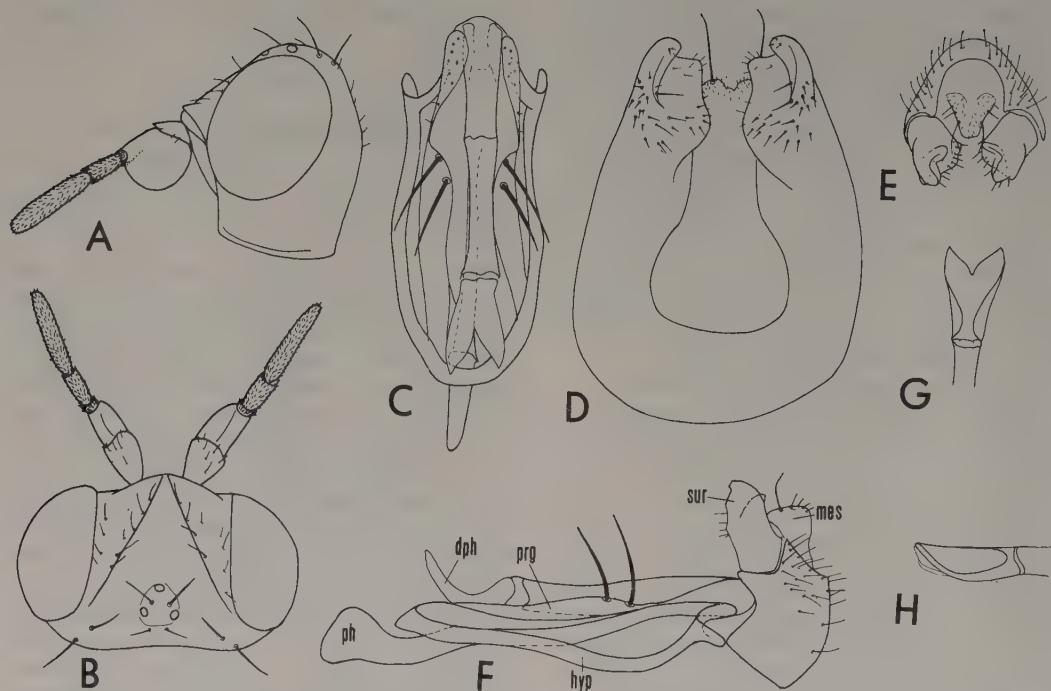


Fig. 78. — A—H. *Semaranga dorsocentralis* Becker. — A. Head, lateral view. — B. Head, dorsal view. — C. Phallic complex, ventral view. — D. Epandrium, ventral view. — E. Epandrium, posterior view. — F. Male genitalia, lateral view. — G. Apical end of distiphallus, ventral view. — H. Ditto, lateral view.

apex. Postgonites long with two extremely long and strong bristles. Distiphallus long and slender, bifid at apex.

Distribution: Ethiopian and Oriental Regions.

Material studied: *Semaranga dorsocentralis* Becker.

Genus *Elachiptereicus* Becker, 1909: 119

Figs 79, 116 J.

Type species: *Elachiptereicus bistriatus* Becker, 1909.

Synonymy: *Opsiceras* Séguy, 1946: 12, type species: *Elachiptereicus abyssinicus* Becker, 1913 (as *Opsiceras bistriatus* Séguy, 1946) (Sabrosky 1964).

Medium size, 3—4 mm, species with red-yellow ground-colour and red or black markings.

Head higher than long, squarish. Eyes rounded oval with oblique long axes and sparse, short hairs. Jowls very broad, up to half height of eye, with numerous dark hairs in inferior half. *vi* indistinct. Cheeks narrow. Frons somewhat projecting, longer than broad,

shining, with few *fr*. Frontal triangle large, behind almost as broad as frons, with somewhat concave side margins reaching front of frons, smooth, shining, reddish. *if* in one row on the margin of the triangle. Ocellar tubercle black. *oc* longer than *if*, about as long as ocellar tubercle, procurved, divergent. *pvt* short, at most half as long as *oc*, procurved, slightly convergent. *vii* somewhat larger than *oc*, incurved. *vte* still somewhat larger, outcurved. *orb* 7—8, short procurved. Occiput pale, with some hairs. Face narrow, flat, with indistinct low carina. Clypeus pale, shining. Proboscis very short. Palpi short with dark hairs. Antennae reddish yellow. *ant*₂ distinctly prolonged. *ant*₃ oblique, oval, pubescent. Arista arising near apex of *ant*₃, black, thick, 3-segmented, with dense, long pubescence. First arisal segment short, 2nd segment as long as dorsal length of *ant*₂. 3rd segment somewhat longer than 1st and 2nd together.

Thorax shining. Humerus without distinct spot and no *h*. Mesonotum moderately convex with five red stripes, covered by evenly dispersed, short, black hairs arising from small

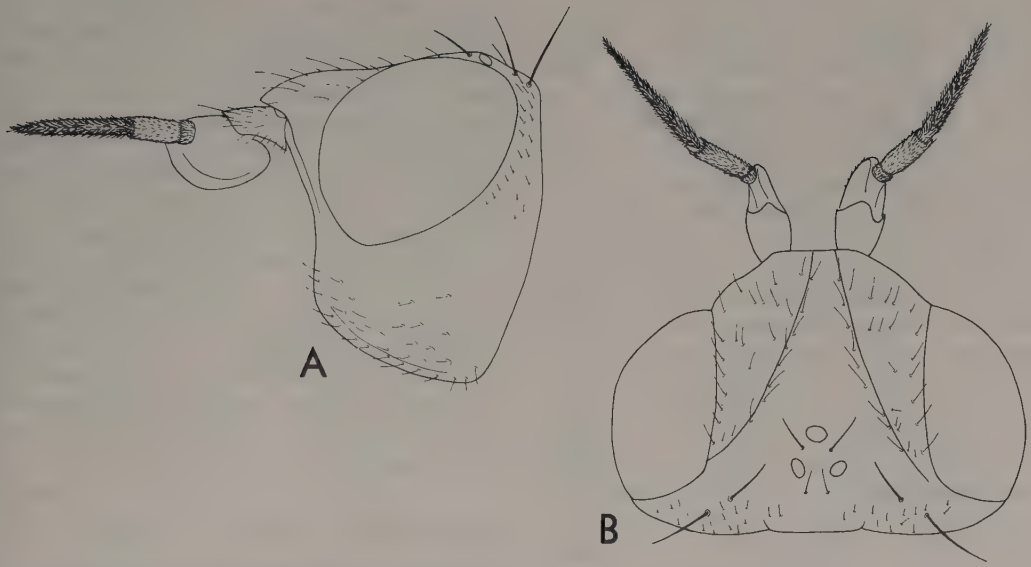


Fig. 79. — A—B. *Elachiptereicus abessynicus* Becker. — A. Head, lateral view. — B. Head, dorsal view.

warts. Bristles mostly long and straight. 1 *anpl*, 2 *p npl*, 1 *a pa*, 1 short, hair-like *p pa*, 1 *dc*. Scutellum rounded, convex, yellowish, shining, with some hairs on the disc arising from small warts. *ap sc* long, straight, rather close together, not quite as long as length of scutellum. 2—3 *la sc*. Pleura smooth, shining, yellowish with pale spots. *mpl* without hairs. *stpl* with a few dark hairs above.

Legs simple, yellow, with dark hairs. *t*₂ with distinct spur. Tibial organ not present.

Wings with cross-veins closely approximated. *r*₂₊₃ and *r*₄₊₅ not procurved. *r*₄₊₅ and *m*₁₊₂ slightly sinuated. Halteres yellow.

Abdomen oval, red, dusted above, with black hairs. Female cerci short.

Distribution: Africa.

Material studied: *Elachiptereicus abessynicus* Becker, ♀.

The *Chlorops* genus group

The *Chlorops* genus group is characterized by slender, shortly to moderately pubescent, dark or white arista, short *ant*₂, rounded or somewhat prolonged (up to 1.5 : 1) *ant*₃, triangular frontal triangle, simple legs, wings of *Chlorops*-type, ovoid or oval abdomen, yellow ground-colour with black markings. There is a tendency for the black to be replaced by red or

for the black to become more dominant. The male genitalia are characterized by long postgonites associated with the phallapodemic sclerite, while the pregonites, usually triangular, are free and have a lateral position.

The type genus of the group, *Chlorops* Meigen, has a large number of species and shows great variation in many characters, eg. colour and shape of *ant*₃ and frontal triangle, extent of dusting, and colour of spots and stripes, etc. It is to be noted that it has smooth mesonotum, at least partly shining frontal triangle, no velvety black spot on mesonotum, bowl-shaped epandrium without projecting corners, simple postgonites, discrete pregonites, short phallus, rounded or slightly prolonged *ant*₃. These characters are different in one or more of the other genera recognized in the group.

The differences between the two subgenera *Chlorops* s. str. and *Anthracophaga* Loew are slight. The latter has dusted frontal triangle with more or less distinct ridges along its margin, *ant*₃ distinctly longer than broad and heavily dusted thorax. The male genitalia are of the same type. Species such as *Chlorops finitima* Becker and *C. frontosa* Meigen with somewhat prolonged *ant*₃ and partly dusted frontal triangle are intermediate and could just as well be included, especially *frontosa*, in *Anthracophaga*.

The Oriental species *sulcifrons* Becker, *quad-*

rilineata de Meijere and *albovariegata* Thomson have usually been attributed to *Anthracophaga*. They have prolonged ant₃, white arista, dusted frontal triangle with distinct ridges and a heavily dusted thorax. With regard to the male genitalia they form a group with projecting hind corners on the epandrium, flat, squarish middle lobe of surstylus, narrow postgonites which at the anterior end are not closely connected with the phallapodemic sclerite. Furthermore they are more extensively black than the *Anthracophaga* species and the thorax is striped with brown and grey dust. I think the differences in the male genitalia are so important, that these species form a monophyletic group, *Anthracophagella* n. gen. *Anthracophaga palluda* Nartshuk is close to *Anthracophagella* with respect to the structure of its frontal triangle and dusting of the mesonotum but has male genitalia of the *Chlorops*-type.

Parectecephala Becker undoubtedly is very close to *Chlorops*. Its ant₃ is more distinctly longer than broad than ant₃ of the other genera of the group. This character in combination with a velvety black spot on mesonotum, hairs on mpl, shining frontal triangle and especially the structure of the pregonites can rectify *Parectecephala* as a genus. The pregonites have a lateral extension on their middles which is inserted into an incision in the hypandrial arms.

Epichlorops Becker is also close to *Chlorops*. The male genitalia are similar, but the anterior ends of the postgonites are less intimately connected with the phallapodemic sclerite. Other characteristics of *Epichlorops* is the large, black, shining, smooth frontal triangle, the coarse microsculpture on the black mesonotum and the curved female cerci.

Melanum Becker is included in this genus group on account of its similarities with certain taxa. It resembles *Chlorops* in its general features. It has a black mesonotum, though smooth, like *Epichlorops* and some *Chlorops* species. It has a large black frontal triangle as *Chlorops scutellaris* (Zetterstedt). The epandrium is special, short, flat, with a lateral carina and a blunt, ribbon-like middle lobe of surstylus. Also the gonites are special with indistinct limits between postgonites and pregonites. It certainly deserves the rank of genus.

It is with some reservation that *Capnoptera* Loew has been included in this genus group. It has a strongly prolonged proboscis and very unusual male genitalia. The phallus is very

long, downcurved and recurved; the postgonites are long and freely projecting anterolaterally; the phallapodeme is low and keel-shaped; the hypandrial arms are very broad. Thus the structure of the phallic complex has obvious similarities with that of *Meromyza* Meigen. Because the general body shape, colours, hind legs, wings and epandrium of *Meromyza* are substantially different I have not included *Capnoptera* in the *Platycephala* genus group. On the other hand *Capnoptera* agrees with *Chlorops* in the above-mentioned characters and therefore I have included it as an aberrant genus in the *Chlorops* genus group. It could perhaps be regarded as an intermediate form between the *Chlorops* and the *Platycephala* genus groups.

Genus *Chlorops* Meigen, 1803: 278

Type species: *Musca pumilionis* Bjerkande, 1778 (as *Oscinis lineata* Fabricius, 1781).

Synonymy: *Oscinis* Latreille, 1804: 196, type species: *Oscinis pumilionis* Bjerkander, 1778 (as *Musca lineata* Fabricius, 1781); *Cotilea* Lioy, 1864: 1123, type species: *Chlorops gracilis* Meigen, 1830 (Sabrosky 1941).

Medium size, yellow species with black or red markings, triangular frontal triangle, smooth and shining or dusted mesonotum, simple, bowl-shaped epandrium, pointed, granulate middle lobe of surstylus, long postgonites united with the phallapodemic sclerite and pregonites lateral of the postgonites.

The genus can be divided into two somewhat indistinct subgenera, *Chlorops* s. str. and *Anthrachophaga* Loew.

Subgenus *Chlorops* Meigen, 1803

Figs 80, 117 A.

Small to medium size, 2.5—4.0 mm, yellow or brownish-yellow species with black or red spots and stripes, dusted or shining.

Head usually higher than long but sometimes longer than high with moderately long, dark bristles. Eyes relatively small rounded to broad oval with oblique long axes, and sparse short hairs. Jowls narrow to broad, from width of t₁ to broader than ant₃, behind broader, often projecting and lower part of posterior surface of head sliding against the broad flat anterior surface of propleuron. Jowls with one row of hairs below. vi short, dark or pale. Cheeks usually visible in side view, narrow. Frons more

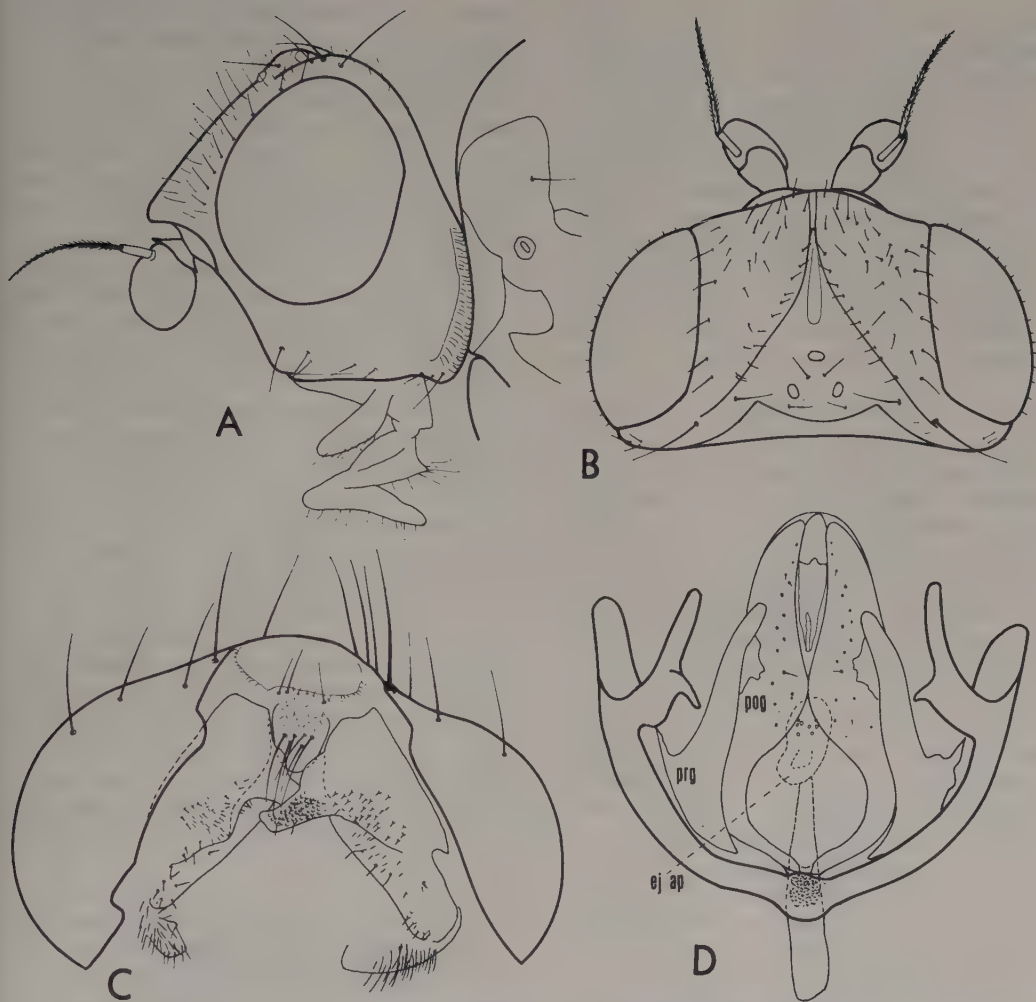


Fig. 80. — A—D. *Chlorops pumilionis* (Bjerkander). — A. Head and anterior part of thorax, lateral view. — B. Head, dorsal view. — C. Epandrium, ventral view. — D. Phallic complex, ventral view.

or less projecting, usually broader than long, not shining, with numerous *fr*. Frontal triangle moderately large, reaching to middle of frons or to front of frons, in latter case often via a narrow stripe, with concave to convex side margins, shining or partly dusted, smooth but sometimes with ridges along margins, yellow to black, often yellow with dark “poplar-leaf-spot” and translucent “window spots”. *if* distinct, along margin of triangle, incurved. *oc* and vertical bristles subequal, of variable length, but usually relatively short. *oc* procurved, divergent. *pvt* procurved, convergent. *vti* incurved. *vte* outcurved. *orb* numerous, short, recurved. Face usually retreating, vibrissal angle sometimes projecting. Facial carina

indistinct. Clypeus pale or black, shining or dusted. Proboscis of moderate size, sometimes prolonged. Palpi longer or shorter, sometimes very short, cylindrical or clavate, with or without sensory groove, yellow or black. Antennae yellow to black. *ant*₂ short. *ant*₃ rounded, higher than long to longer than high but not distinctly ($<1:1.5$) prolonged. Arista slender, black or white, with short to distinct pubescence.

Thorax yellow or brownish with black or red markings, dusted or shining. Humerus with dark spot and distinct *h*. Mesonotum rather convex, with five black or red stripes which sometimes are partly or completely confluent, smooth, evenly covered by numerous short,

pale or dark hairs. Bristles well-developed, subequal. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*. Scutellum rounded, convex, usually yellow, dusted, with numerous hairs. *ap sc* almost as long as scutellum, not distinctly close together. 1—3 *la sc*. Pleura smooth, shining or dusted, with black or red spots. Subspiracular callus sometimes black. *mpl* without hairs or in some species with some short indistinct bristle-like hairs. *stpl* with pale hairs above and below.

Legs normal, pale, more or less darkened. Male fore tarsi sometimes modified with regard to length of segments, size and shape of claws, etc.

Wings of Chloropinae-type. *t_a* inside or opposite tip of *r₁*. Halteres yellow.

Abdomen oval, yellowish, often with dark transverse bands or completely darkened, dusted above, with dark or pale hairs. Female cerci long or short. Middle lobe of surstylus with large granulate or hook-like apex. Lower lobe long, hairy. Postgonites long, almost reaching hypandrium. Pregonites large, broadened in anterior part, situated later of postgonites.

Distribution: Species referred to *Chlorops* have been recorded from all faunal regions except Antarctica. I have seen species of *Chlorops*, as delimited here, from the Palaearctic, Ethiopian and Oriental Regions.

Bionomics. *Chlorops* species are recorded from grasses and *Carex* (Nartshuk 1972).

Material studied: *Chlorops pumilionis* (Bjerkander); *C. fasciata* Meigen, 1830; *C. finitima* Becker, 1910; *C. frontosa* Meigen, 1830; *C. adjuncta* Becker, 1910; *C. laeta* Meigen, 1830; *C. varsoviensis* Becker, 1910; *C. brevimana* Loew, 1866; *C. obscurella* (Zetterstedt, 1838); *C. calceata* Meigen, 1830; *C. figurata* (Zetterstedt, 1848); *C. geminata* Meigen, 1830; *C. gracilis* Meigen, 1830; *C. hypostigma* Meigen, 1830; *C. meigeni* Loew, 1866; *C. pannonica* Strobl, 1893; *C. planifrons* Loew, 1866; *C. rufina* (Zetterstedt, 1848); *C. scalaris* Meigen, 1830; *C. speciosa* Meigen, 1830; *C. scutellaris* (Zetterstedt, 1838); *C. troglodytes* (Zetterstedt, 1848).

Subgenus **Anthracophaga** Loew, 1866: 15

Figs 81, 117 B.

Type species: *Musca strigula* Fabricius, 1794.

Species of medium size, 3—4 mm, and of *Chlorops*-like shape. General colour indistinct

yellow or brownish-yellow with brown to black markings. The whole body, apart from a few small areas, very heavily dusted.

Head higher than long, yellow with brown areas and with short, mostly dark bristles. Eyes small, rounded, with sparse short hairs. Jowls broad, about half the height of eyes, yellow with a brown, shining stripe below and with one row of pale peristomal hairs and a few hairs above in front. *vi* indistinct or absent. Cheeks distinct. Frons broader than long, yellow, dusted with some *fr*. Frontal triangle large, broad behind, with slightly concave side margins as a narrow tip reaching front of frons, brown to black, heavily dusted, wrinkled with ridges and grooves along margins and in front. *if* in one row along the margin of frontal triangle. *oc* short, proclinate, parallel or slightly convergent, situated broadly apart (about opposite outer margin of posterior ocelli). *pvt*, *vti*, *vte* short, indistinct, very difficult to separate from other hairs on ocellar tubercle or on vertex. *orb* 6—8, short, indistinct, slightly recurved. Occiput brown. Face yellow, short, narrow, with low, narrow carina and black facial ridges. Clypeus black, dusted. Proboscis short. Palpi short, darkened, with distinct antero-lateral groove. Antennae brownish. *ant₂* somewhat prolonged. *ant₃* longer than high. Arista with short dark basal joints and white, pubescent flagellum.

Thorax *Chlorops*-like, almost completely covered with heavy, grey dust. Humeri with small spot and indistinct *h*. Mesonotum with five broad longitudinal stripes, and evenly covered with short hairs. 1 *a npl*, 2 *p npl*, 1 *p pa*, 1 *dc*. Scutellum rounded, dorsally somewhat flattened, brownish yellow, dusted, hairy on the disc. 1 short *ap sc* and 1—3 pairs of shorter *la sc*. Pleura dusted with brown to black spots. Subspiracular callus shining, black. *mpl* without hairs. *stpl* with black spot and pale hairs.

Legs short, simple, without tibial organ.

Wings of *Chlorops*-type. Halteres yellow.

Abdomen with brown tergites, dusted, with black hairs. Male genitalia of *Chlorops*-type with simple epandrium and middle lobe of surstylus terminating in a granulated callus with a conical point.

Distribution: Most of the species published as *Anthracophaga* belong to other genera. The type species *A. strigula* (Fabr.) is recorded from various parts of Europe. *A. palluda* Nartsh.: SW Asia.

Material studied: *Anthracophaga strigula* (Fabricius); *A. palluda* Nartshuk, 1963.

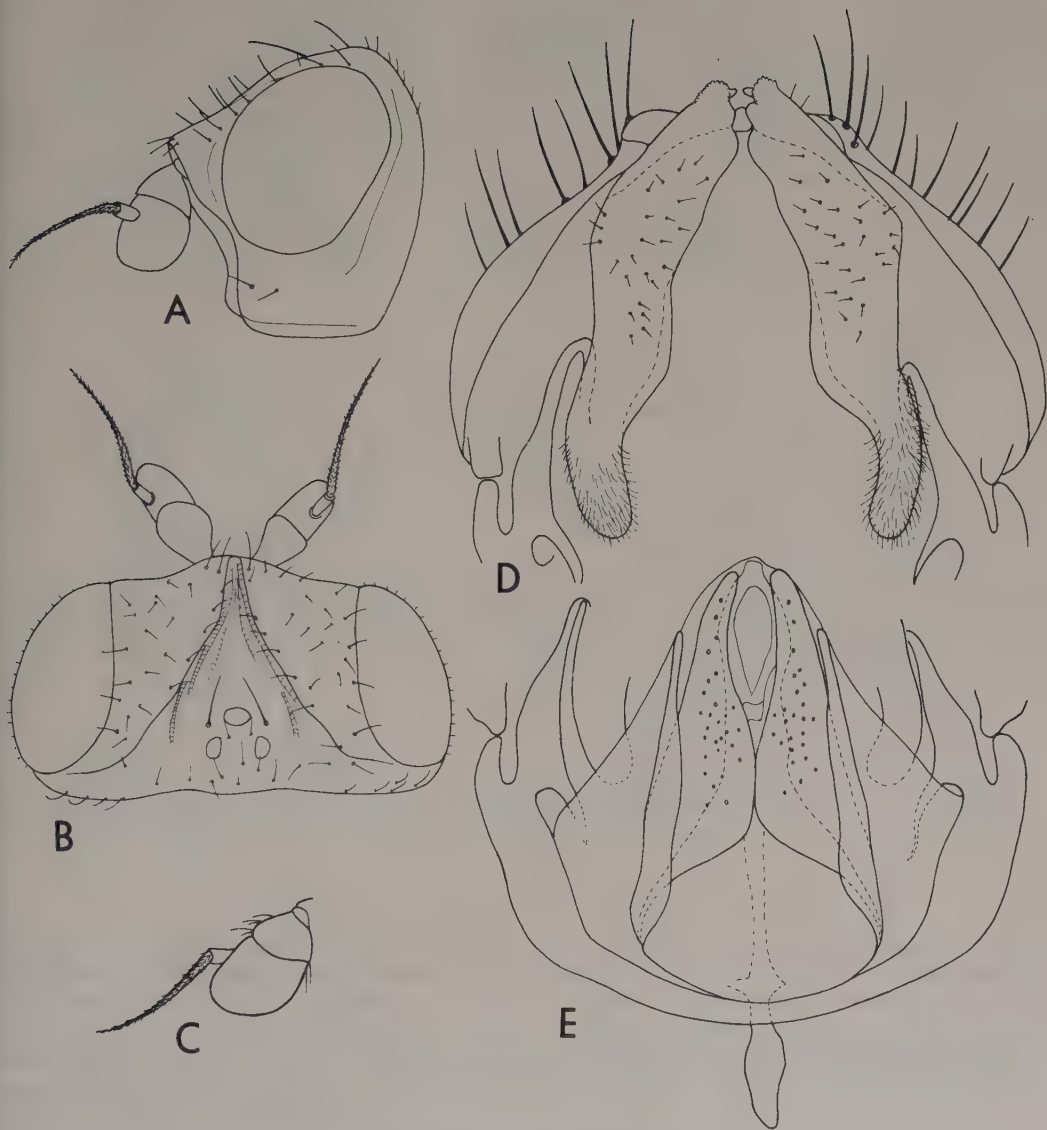


Fig. 81. — A—E. *Chlorops (Anthacophaga) strigula* (Fabricius). — A. Head, lateral view. — B. Head, dorsal view. — C. Antenna, inner side. — D—E. Male genitalia, ventral view.

Genus *Anthracophagella* n. gen.

Figs 82, 117 C.

Type species: Anthracophaga sulcifrons Becker, 1911.

Species of medium size, 2.5—3.5 mm. Colour indistinctly whitish-yellow with extensive brown to black markings and heavy grey or brown dust; the general impression is therefore of a dark colour with a few pale areas.

Head long or somewhat longer than high

with moderately projecting frons, dusted, whitish to brownish-yellow with buff to brown markings. Bristles short, black. Eyes of medium size, rounded or somewhat oval with horizontal long axes, naked or with very few short hairs. Jowls broad as ant₃ or narrower, yellowish with shining lower margin and with one row of pale peristomal hairs. *vi* indistinct or absent. Cheeks well-developed. Frons longer than broad, dull, yellowish to brownish, with few *fr*. Frontal triangle large, broad behind,

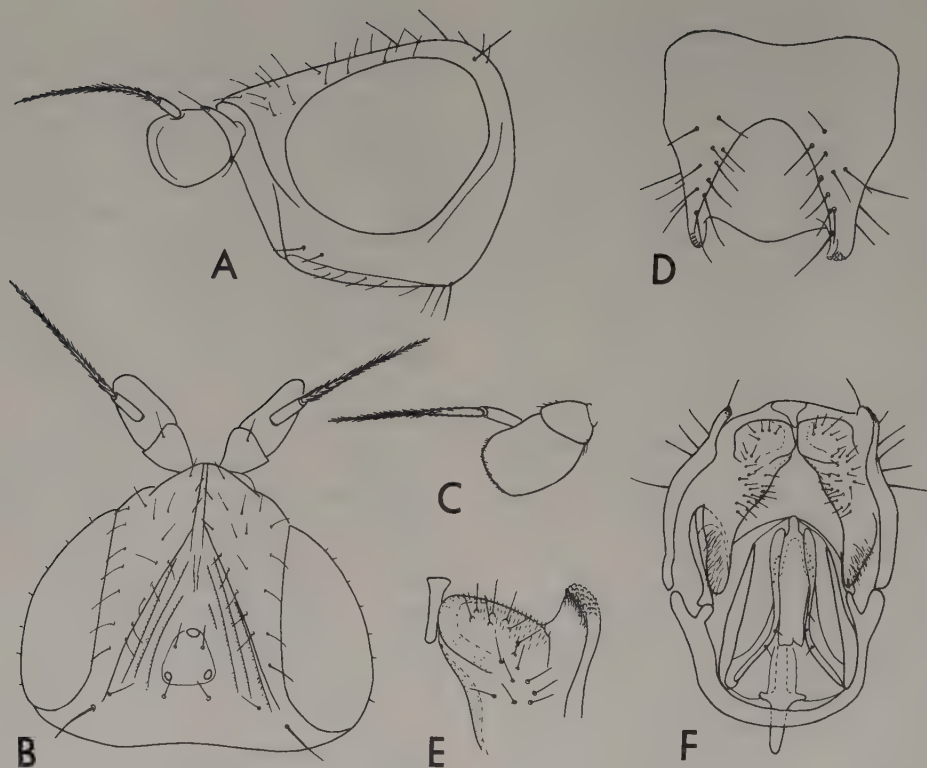


Fig. 82. — A—F. *Anthracophagella sulcifrons* (Becker). — A. Head, lateral view. — B. Head, dorsal view. — C. Antenna, inner side. — D. Epandrium, dorsal view. — E. Mesolobus, surstylus and epandrial cornus, postero-ventral view. — F. Male genitalia, ventral view.

with almost straight side margins as a surface reaching about $2/3$ length of frons and from there via a longitudinal ridge, which starts in front of anterior ocellus, reaching front of frons. Triangle dusted, with 2—3 ridges and grooves on each side parallel to side margins. *if* in a row along the side of the frontal triangle. *oc*, *pvt*, *vti*, *vte* short, subequal or *vte* somewhat longer. *oc* procurved, parallel or slightly divergent, situated in normal position, relatively close together and behind front ocellus. *pvt* upright, convergent. *vti* incurved. *vte* outcurved. *orb*, 3—7, short, indistinct, slightly recurved. Occiput darkened with few short hairs. Face somewhat retreating without distinct carina, facial ridges pale. Clypeus yellowish to black, shining, dusted behind. Proboscis short. Palpi brownish to black, mostly rather stout, with pale hairs. Antennae brownish to black. *ant*₂ somewhat prolonged. *ant*₃ squarish, longer than high (ratio about 10 : 7—8). Arista with brown or yellow basal segments. Flagellum white and pubescent.

Thorax somewhat flatter and longer than in most *Chlorops* species, completely covered with dense dust and with short dark bristles and hairs. Humeri yellowish with dark spot and indistinct bristle. Mesonotum probably black but covered by such heavy dust that the ground colour cannot be seen in dry specimens. The dust is mostly brown but is grey in five more or less complete stripes in the areas where black stripes are present in most *Chlorops* species. Mesonotum completely and evenly covered with short dark hairs. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*. Scutellum rounded or dorsally somewhat flattened, yellow or dark, heavily dusted, with numerous hairs on the disc. *ap sc* shorter than scutellum, 2 *la sc*. Pleura yellow to brown with indistinct brown spots, with heavy grey dust. Subspiracular callus well-developed, usually dark and shining. *mpl* without bristles. *stpl* with black spot and a few pale hairs.

Legs short, simple, extensively darkened, without tibial organ.

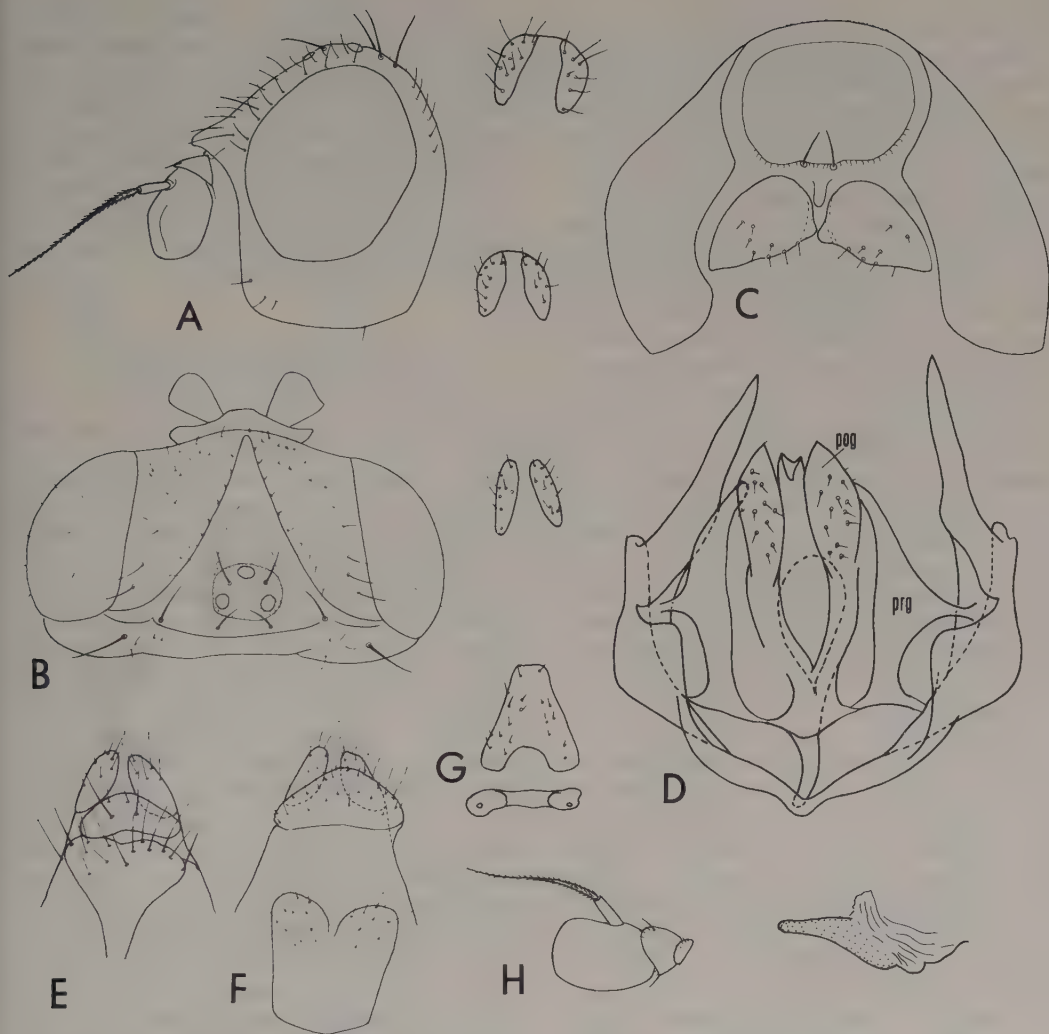


Fig. 83. — A—I. *Parectecephala longicornis* (Zetterstedt). — A. Head, lateral view. — B. Head, dorsal view, ant₃ omitted. — C. Epandrium, postero-ventral view. — D. Phallic complex, ventral view. — E. Apex of ovipositor, dorsal view. — F. Ditto, ventral view. — G. Female S₁—S₅. — H. Antenna, inner side. — I. Ejaculatory apodeme.

Wings of *Chlorops*-type. Halteres white-yellow or with brownish knob.

Abdomen ovoid with dark, or at sides, yellow tergites, dusted, with black hairs. Epandrium with dorsal apical corners projecting and granulate. Middle lobe of surstyli flat, flap-like. Postgonites narrow with bristles below middle. Pregonites narrow removed from the postgonites.

Distribution: Oriental Region.

Material studied: *Anthracophagella sulcifrons* (Becker, 1911) n. comb. (*Anthracophaga s.*); *Anthracophagella quadrilineata* (de Mei-

jere, 1910) n. comb. (*Anthracophaga q.*); *Anthracophagella albovariegata* (Thomson, 1868) n. comb. (*Eurina a.*).

Genus *Parectecephala* Becker, 1910: 105

Figs 83, 117 D.

Type species: *Oscinis longicornis* Zetterstedt, 1848.

Medium sized species, about 4 mm, of *Chlorops*-like shape with velvety black spot in anterior part of inner lateral mesonotal stripes, prolonged ant₃ and white arista.

Head higher than long, yellow with darker markings and short bristles. Eyes oval with vertical long axes and with sparse short hairs. Jowls somewhat broader than ant₃ with pale hairs below and behind. *vi* indistinct. Cheeks narrow. Frons very little projecting, broader than long, dusted, with dark *fr*. Frontal triangle behind broad as about 3/4 of frons, with concave side margins reaching front of frons as a narrow stripe, shining, smooth, yellow at sides, largely black centrally including ocellar tubercle, and with indistinct window spots. *if* in one row along margin of triangle, incurved. *oc* and vertical bristles short, subequal. *oc* procurved, divergent. *pvt* procurved, convergent. *vti* incurved, *vte* outcurved, *orb* about 7, indistinct, mostly recurved. Face narrow, with narrow, low carina. Clypeus narrow, shining black. Proboscis short. Palpi somewhat stout, black. Antennae yellow, darkened in upper part. ant₁ very short but visible. ant₂ short. ant₃ squarish longer than broad, shortly pubescent. Basal segments of arista naked, yellowish, flagellum slender, white with short, rather thick pubescence.

Thorax yellow with black and brown markings and moderately well-developed bristles and hairs. Mesonotum convex as in *Chlorops* with five longitudinal stripes. Inner lateral stripes anteriorly with a large, rounded, velvety black spot. Mesonotum smooth, dusted, unevenly covered with dark, short hairs. Humerus with spot and 1 *h*. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*. Scutellum rounded, convex, yellow but brown on the disc, dusted, with few hairs. *ap sc* about half length of scutellum. 1 distinct *la sc*. Pleura smooth, mostly dusted, yellow with black or brown spots. *mpl* dusted, anteriorly below with one shining black spot, and with some small dark hairs. *stpl* dusted with brown, above darker spot and a few pale hairs.

Legs normal, simple, yellow with dark spot. Tibial organ absent.

Wing of *Chlorops*-type. Halteres yellow.

Abdomen oval, brownish above with short dark hairs. Female cerci short. Middle lobe of surstyli with small, flat apical end. Postgonites long, reaching hypandrium, with many small bristles. Pregonites lateral of postgonites as in *Chlorops*.

Distribution: Species referred to *Parectecephala* have been recorded from the Holarctic, Neotropical, Ethiopian and Oriental Regions. *P. longicornis* (Zett.) is Palearctic.

Material studied: *Parectecephala longicornis* (Zetterstedt).

Remarks. The species usually referred to *Parectecephala* are distinguished from *Chlorops* only by the shape of ant₃ which is longer than broad (at least 1.5 : 1) in *Parectecephala*. These species usually have no velvety black spots on the mesonotum and no hairs on *mpl*. There is a wide variation in head structure, shape of frontal triangle, colour pattern and dusting. These species should therefore be revised and their male genitalia studied.

Genus **Epichlorops** Becker, 1910: 77

Figs 84, 117 E.

Type species: *Oscinis puncticollis* Zetterstedt, 1848.

Medium size, about 3 mm, black and yellow species.

Head long as high, with short hairs and very short bristles. Eyes broad oval with almost horizontal long axes and sparse, short hairs. Jowls about as broad as height of ant₃, yellow, dusted, with one row of pale hairs. *vi* indistinct. Cheeks narrow. Frons somewhat projecting, longer than broad, yellow, dusted, with very few *fr*. Frontal triangle very large, behind almost as broad as frons, with basally convex, apically concave side margins reaching front of frons in a rather broad tip, smooth, shining, black. *if* of moderate size in one row along the margin of the triangle. *oc* very short, hair-like, much shorter than ocellar tubercle, procurved, divergent. *pvt* shorter than *oc*, procurved, convergent. *vti* and *vte* indistinct, hair-like. *orb* about 6, short, recurved. Occiput black. Face short, slightly concave, without distinct carina. Clypeus black, shining in front. Proboscis short. Palpi short, slender, with pale hairs. Antennae black. ant₂ normal. ant₃ rounded squarish, long as high, pubescent. Arista dark, basal segments rather thick, flagellum slender, pubescent.

Thorax with very short bristles. Humerus with small, dark spot, without distinct *h*. Mesonotum moderately convex, shining, black, only with margins narrowly yellow, evenly covered with short, dark hairs arising from distinct star-like warts, therefore with coarse microsculpture. 1 *a npl*, very small hair-like, pale, 2 *p npl*, small pale or the lowermost sometimes dark. 1 distinct, short *a pa* rather close to the shorter *p pa*. 1 short *dc*. Scutellum rounded, convex, yellow, shining, with few dark hairs arising from small warts on the disc. *ap sc* about as long as scutellum. 1—2 *la sc*. Pleura smooth, yellow, with brown to black

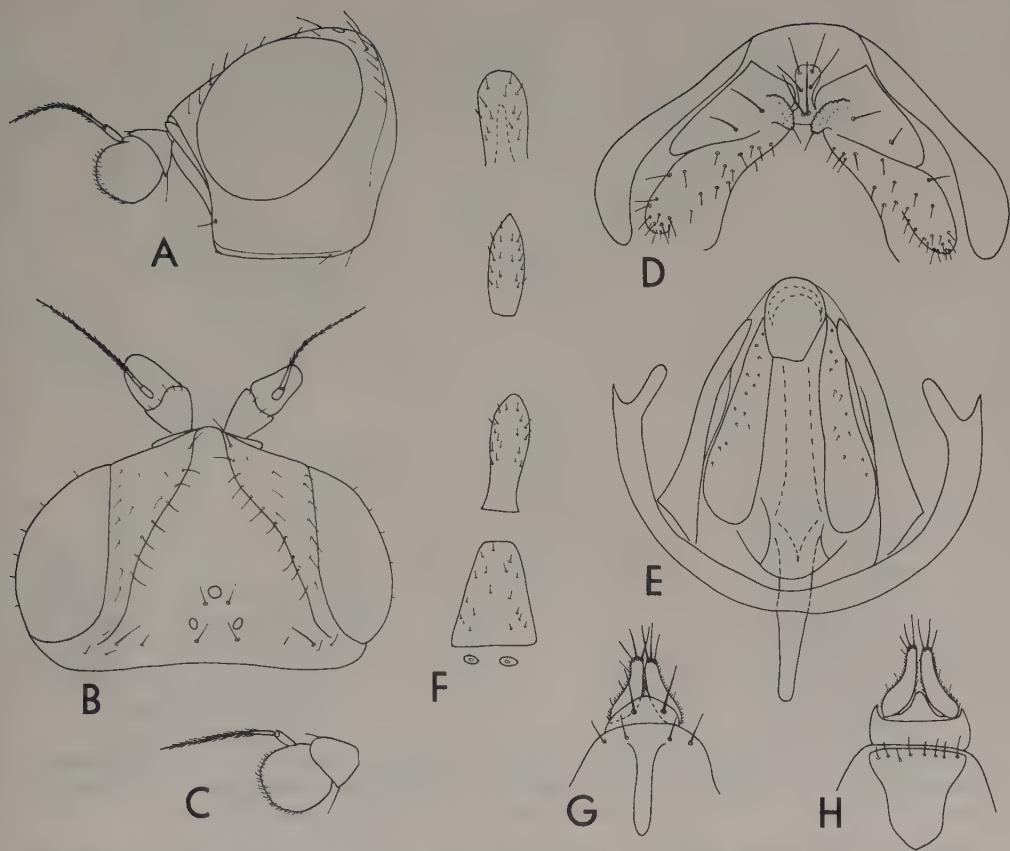


Fig. 84. — A—H. *Epichlorops puncticollis* (Zetterstedt). — A. Head, lateral view. — B. Head, dorsal view. — C. Antenna, inner side. — D. Epandrium, ventral view. — E. Phallic complex, ventral view. — F. Female S_1 — S_5 . — G. Apex of ovipositor, dorsal view. — H. Ditto, ventral view.

spots, except hpl, shining. mpl without hairs. mn black, dusted.

Legs normal, yellow with dark patches. t_2 with short spur. Tibial organ absent.

Wings of *Chlorops*-type. Halteres yellow.

Abdomen oval, above dark brown, dusted, with black hairs, below yellow with pale hairs. Female cerci conical, curved. Male genitalia of *Chlorops*-type.

Distribution: Holarctic Region.

Material studied: *Epichlorops puncticollis* (Zetterstedt).

Genus **Melanum** Becker, 1910: 50

Figs 85, 117 F.

Type species: *Chlorops lateralis* Haliday, 1840.

Medium size, 3—4 mm, *Chlorops*-like, black and yellow species.

Head trapezoid, about high as long, yellow with black spots. Eyes squarish to rounded, naked, with long axes vertical. Jowl narrower than width of ant_3 with one row of pale hairs. Vibrissal angle projecting, without distinct *vi*. Cheek broad as jowl. Frons not projecting, broader than long, yellow, dusted, with few pale *fr*. Frontal triangle large, behind almost broad as frons, with slightly convex side margins reaching $2/3$ length of frons and as a narrow line reaching front of frons, smooth, shining, black. *if* in one row along the margin. *oc* and vertical bristles short, hair-like, dark. *oc* procurved, divergent. *pvt* procurved, convergent. *vti* incurved. *vte* outcurved. About 6 short, indistinct, pale, recurved *orb*. Occiput black. Face projecting below, with a low, narrow carina. Clypeus narrow, black, with long lateral processes. Proboscis somewhat prolonged. Labella long. Palpi normal, cylindrical,

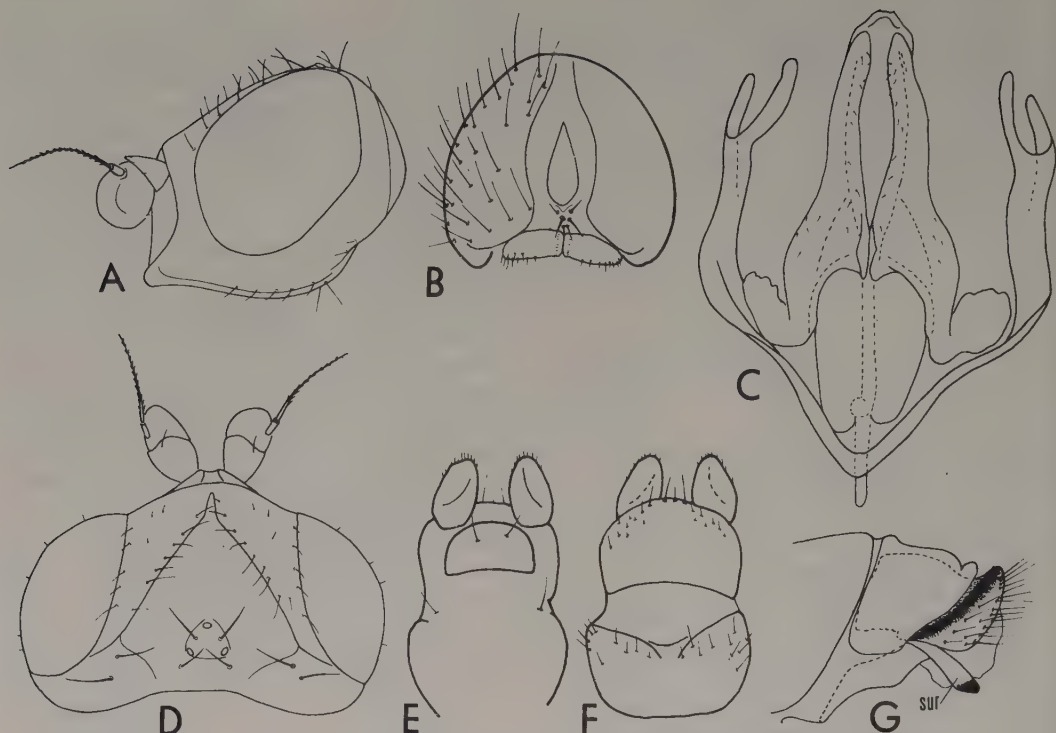


Fig. 85. — A—G. *Melanum laterale* (Haliday). — A. Head, lateral view. — B. Epandrium, posterior view. — C. Phallic complex, ventral view. — D. Head, dorsal view. — E. Apex of ovipositor, dorsal view. — F. Ditto, ventral view. — G. Apex of male abdomen.

with pale hairs. Antennae black. ant₂ short. ant₃ rounded, somewhat higher than long, shortly pubescent. Arista black, basal segments rather thick, flagellum slender with short pubescence.

Thorax *Chlorops*-like with short, indistinct, pale to dark bristles. Humerus yellow with brown spot and indistinct *h*. Mesonotum rather convex, black, smooth, evenly covered with short hairs, grey dust and small, rounded, shining spots around the bases of the hairs. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*. Scutellum rounded, dusted, yellow on the disc, dark along margins, with few hairs on the disc. *ap sc* short, about half length of scutellum. 1 short *la sc*. Pleura smooth. Subspiracular callus black on lower half. *mpl* shining, except behind, without hairs. *stpl* with black spot, dusted, with few hairs.

Legs normal, simple, pale with darker spot and darker tarsi, without tibial organ.

Wings of *Chlorops*-type. Halteres white.

Abdomen oval, dark, dusted, with dark hairs, yellow at sides and below. Female cerci very

short. Epandrium flat below and with carina along lower margin. Middle lobe of surstyli rectangular. Postgonites long with many short bristles. Pregonites indistinct.

Distribution: Palaearctic Region.

Material studied: *Melanum laterale* (Haliday).

Remarks: From the description *Chlorops chovdensis* Nartshuk, 1975, seems to belong to *Melanum*. The male genitalia are very similar to those of *M. laterale* (Hal.).

Genus *Capnoptera* Loew, 1866: 11

Figs 86, 117 G.

Type species: *Musca scutata* Rossi, 1790 (as *Capnoptera melanota* Loew, 1866) (Sabrosky 1941).

Medium size species, 4—5 mm, *Chlorops*-like, yellow with black markings and long, curved phallus.

Head yellow with black frontal triangle and occiput, as long as high. Bristles short, black. Eyes relatively small, rounded squarish, with

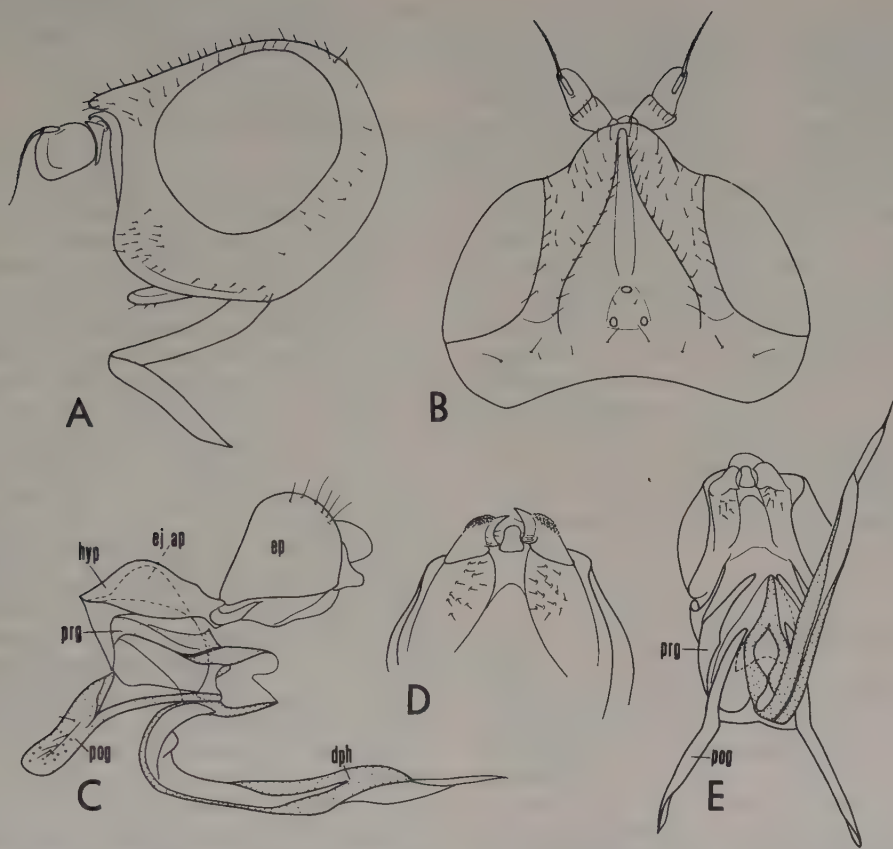


Fig. 86. — A—E. *Capnoptera scutata* (Rossi). — A. Head, lateral view. — B. Head, dorsal view. — C. Male genitalia, lateral view. — D. Surstyli, ventral view. — E. Male genitalia, ventral view.

oblique long axes, naked. Jowls broad, with black hairs, behind in one row, in front forming a small group. Cheeks broad, as broad as height of ant_3 . vi indistinct. Frons longer than broad with some (about 60) fr . Frontal triangle large, broad behind, reaching front of frons as a long narrow point. if short as fr , in one row along the margin of the frontal triangle, which is smooth black, shining and with a narrow groove from the anterior ocellus to the tip. oc very small, shorter than if , divergent. pvt small, about as long as fr , convergent. vii and vte very small, about the same length as pvt . Face vertical, not projecting or retreating. Clypeus very narrow and long. Palpi long, cylindrical. Proboscis long, narrow, with long labella. ant_2 of moderate size, not prolonged. ant_3 somewhat longer than broad, with short pubescence. Arista dark, short, with very short pubescence.

Thorax of *Chlorops*-like shape, yellow, with black marking, smooth, thinly dusted, subshining, with short black hairs and bristles. Humeri with 1 indistinct h . Mesonotum with short bristles. 1 $a\ npl$, 2 $p\ npl$, 1 $a\ pa$, 1 $p\ pa$ and 1 dc . Relatively few short hairs evenly dispersed over the mesonotum. Scutellum short, rounded, *Chlorops*-like, yellow, dusted, with short $ap\ sc$ and 1 pair of shorter $la\ sc$ and a few black hairs on the disc. Mesopleuron with pale dust and few (about 15) black hairs. Other pleura mostly shining.

Legs simple, short. No tibial organ.

Wings short, brownish, with very coarse dark brown veins. r_{2+3} and especially r_{4+5} at tip curved towards the costa. m_{1+2} recurved at tip. t_a opposite ending of r_1 . Discal cell long. Halteres yellow.

Abdomen oval, black to brown, dusted, with black hairs. Sternites very small and narrow.

Tergites broad with side-margins broadly turned over. Epandrium as in *Chlorops*, with mesolobus. Median lobe of surstylus apically double-pointed and with granulae. Lower lobe of surstylus long, hairy. Hypandrium with very broad lateral arms but narrow, in part, between the arms. Phallus very long and curved, behind in basal part with a backwards-directed, pointed apodeme. Phallus at base directed forwards then curving downwards and backwards. Phallapodemic sclerite trough-shaped, serving as a recess for the phallus when in the resting position. Phallapodeme short, broad, keel-shaped. Postgonites very long and narrow. When the phallus is turned out the postgonites diverge and are directed forward. Pregonites long, situated lateral of postgonites.

Distribution: S Europe, N Africa.

Material studied: *Capnoptera scutata* (Rossi), ♂.

The *Diptotoxa* genus group

This genus group contains only one genus, *Diptotoxa* Loew and is characterized by its wings and male genitalia. The wings have veins r_{2+3} and r_{4+5} strongly procurved, r_{4+5} and m_{1+2} divergent and t_a — t_p shorter than t_p . The male genitalia lack a discrete phallus and the pregonites, postgonites, phallapodeme and phallapodemic sclerite are fused into a rigid structure that articulates with the hypandrium and probably functions as a "pseudophallus". A similar, rigid phallic structure is present in *Eurina* which could indicate a common ancestry for the two genera. The *Diptotoxa*-type of wings is also present in *Pseudopachychaeta*, the species of which have often been referred to *Diptotoxa*. However, the great differences in the male genitalia exclude any closer relationship between these genera.

Genus *Diptotoxa* Loew, 1863: 54

Type species: *Diptotoxa versicolor* Loew, 1863.

Synonymy: *Anthobia* Lioy, 1864, type species:

Oscinis messoria Fallén, 1820, as *Anthobia lateralis* (Macquart, 1835) (Sabrosky 1941).

The species of *Diptotoxa* have a *Chlorops*-like general shape but distinct wings and male genitalia as described above.

I think the genus should be divided into the two subgenera *Diptotoxa* s. str. and *Diptotoxoides* n. subg. because of the differences in

the arrangement of the *if* and in the structure of the epandrium, surstyli and phallic complex.

Subgenus *Diptotoxa* Loew, 1863

Figs 87, 117 H.

Medium size species, 3—4 mm, *Chlorops*-like, with cross-veins closely approximated.

Head as long as high, yellow with black markings and short bristles. Eyes large, rounded, $\pm$ semispherical, naked. Anterior ommatidia distinctly larger than the posterior ones. Jowls somewhat narrower than height of ant₃, about 1/4 height of eyes, dusted, with one row of pale hairs, and two longer peristomal hairs. *vi* distinct, white. Cheeks not visible from the side. Frons somewhat projecting, longer than broad, shining, with few *fr*. Hairs and bristles on frons black. Frontal triangle large, with convex side margins almost reaching front of frons, black, shining, irregularly wrinkled especially along margins and at tip. Numerous, incurved *if* in one row on the triangle. *oc* short, slightly longer than *if*, procurved, indistinctly divergent or parallel. *pvt* shorter than *oc*, procurved, indistinctly convergent or almost parallel. *vii* short as *pvt*, incurved. *vte* short, stouter than *oc*, outcurved. 8—9 indistinct, recurved *orb*. Occiput black. Face concave, without carina. Clypeus black, shining in front. Palpi short, narrow, with pale hairs: Proboscis short. Antennae black. ant₂ not prolonged. ant₃ about as long as high, somewhat squarish, pubescent. Basal segments of arista brownish, flagellum white, shortly pubescent.

Thorax. Humeri yellow with black spot, without distinct *h*. Mesonotum moderately convex, with shallow impressions along dorso-central lines, brownish yellow at sides, otherwise almost black because of the nearly confluent black stripes, with rather coarse, irregularly transversely striated microsculpture, dusted and evenly covered with short, black hairs. A small rounded black spot above *a npl*. 1 slender *a npl*, 2 *p npl*, the upper distinctly smaller, 1 *a pa*, 1 small, hair-like *p pa*, 1 *dc*. Scutellum rounded convex, brownish, dusted, disc with hairs. *ap sc* about half as long as length of scutellum. 1 *la sc*. Pleura yellow or brownish yellow with black spot, shining, except *hpl*. Subspiracular callus brown. *mpl* naked. *stpl* with black spot and few pale hairs.

Legs simple, yellowish, more or less darkened. *t*₂ with a distinct, slightly curved spur. Tibial organ absent.

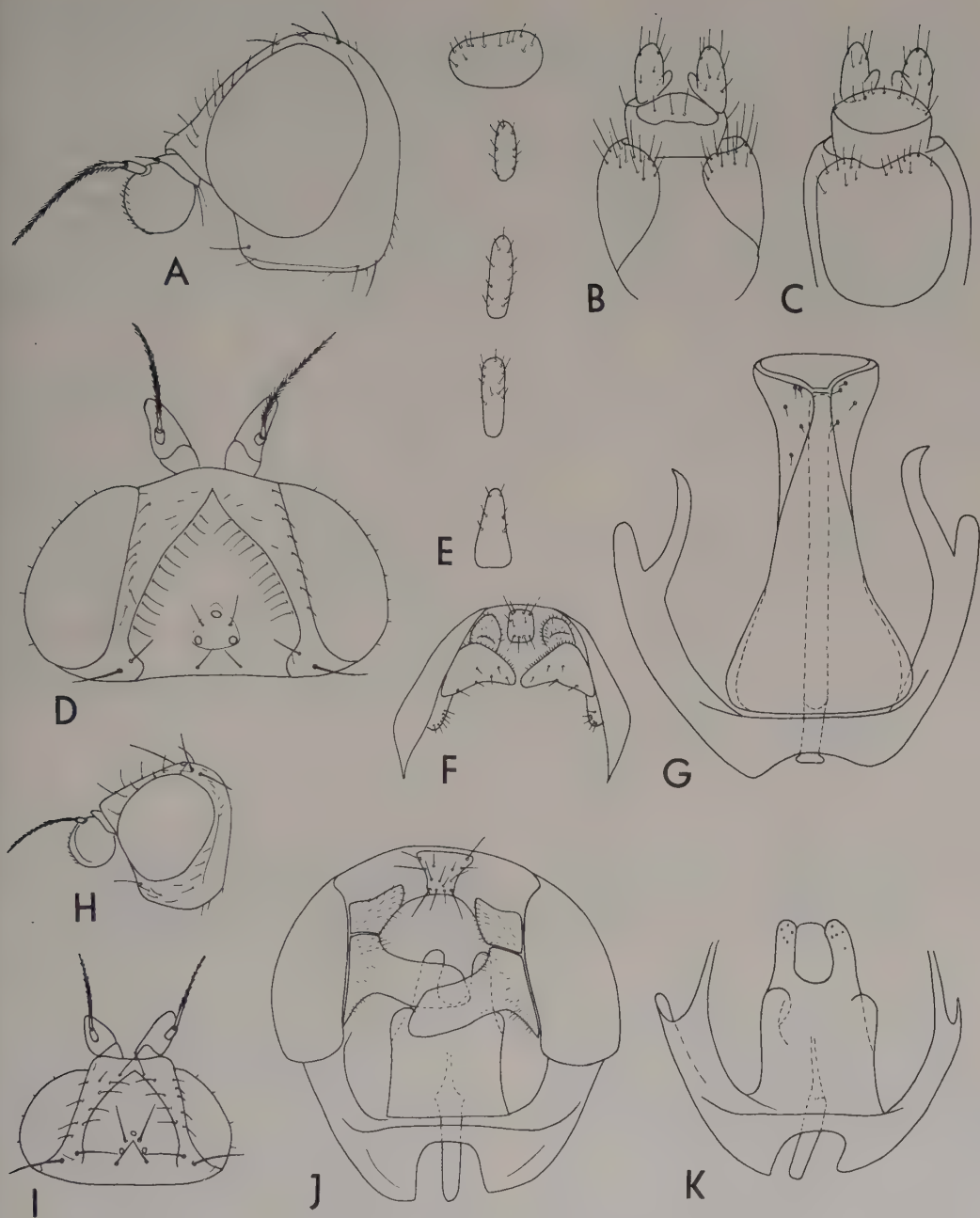


Fig. 87. — A—G. *Diplotoxa messoria* (Fallén). — A. Head, lateral view. — B. Apex of ovipositor, dorsal view. — C. Ditto, ventral view. — D. Head, dorsal view. — E. Female S_2 — S_6 . — F. Epandrium, ventral view. — G. Phallic complex, ventral view. — H—K. *Diplotoxa* (*Diplotoxoides*) *dalmatina* Strobl. — H. Head, lateral view. — I. Head, dorsal view. — J. Male genitalia, epandrium postero-ventral view, phallic complex, ventral view. — K. Phallic complex, ventral view.

Wings with t_a and t_p approximated, distance between them about as long as t_p . t_a opposite the ending of r_1 . r_{2+3} relatively short and procurved, all four costal segments therefore subequal in length. Halteres yellow.

Abdomen ovoid, brown, dusted above, with rather long pale hairs. Female cerci with a small basal lobe. S_6 broad. Postgonites, pregonites, phallapodeme and phallapodemite sclerite fused to form a long, narrow, apically cylindrical structure. Discrete phallus absent.

Bionomics: The larvae develop in Cyperaceae (*Eleocharis*) (Nartshuk 1972).

Distribution: Not clear due to lumping with *Pseudopachychaeta* (*Lasiosina* auctt.). The type species is holarctic.

Material studied: *Diplotoxa messoria* (Fallén).

Subgenus *Diplotoxoides* n. subgen.

Figs 87, 117 I.

Type species: *Diplotoxa dalmatina* Strobl, 1900: 252.

Small species, 2 mm, with general ground-colour brownish yellow with indistinct brown to black markings.

Head high as long. Eyes large, rounded, with somewhat oblique long axes, naked. Anterior ommatidia larger than the posterior ones. Jowls narrower than height of ant_3 , about 1/4 height of eyes, yellow, dusted, with one row of pale hairs. vi distinct, dark. Cheeks invisible in side view. Frons somewhat projecting with rather strong, dark bristles, longer than broad, yellowish, dusted, with no or very few fr . Frontal triangle large, behind almost as broad as frons, with convex side margins almost reaching front of frons, smooth, shining, dark brown. if rather long in one row along the margin of the triangle. oc distinct, longer than ocellar tubercle, procurved, divergent. pvt distinctly shorter than oc , procurved, convergent. vte a little shorter than oc , incurved. vte long as oc , outcurved. orb 6—7 short, recurved, Vertex black. Face distinctly concave, without carina. Clypeus narrow, black, shining. Proboscis short. Palpi short, slender, yellow, with dark hairs. Antennae brownish to black. ant_2 short. ant_3 small, rounded, higher than long, pubescent. Arista dark with short pubescence.

Thorax. Humerus yellowish with brown spot and 1 h . Mesonotum moderately convex, brownish with indistinct, dark brown stripes, smooth, subshining, with brown dust and

evenly covered by sparse, short, dark hairs. 1 short, hair-like $a\ npl$, 2 $p\ npl$, 1 $a\ pa$, 1 short, hair-like $p\ pa$, 1 dc . Scutellum rounded, convex, brownish yellow, dusted, with few hairs above and along sides. $ap\ sc$ nearly as long as scutellum. 1 $la\ sc$ half-way between $ap\ sc$ and front margin in a rather dorsal position. Pleura brownish yellow with brown-black spots, shining, except hpl . mpl without hairs. $stpl$ with black spot and few pale hairs. mn dusted.

Legs rather long, mostly dark, simple. t_2 with distinct spur, long as width of tibia. Tibial organ absent.

Wings of *Diplotoxa*-type, with approximated cross-veins and subequal costal segments. Halteres yellow.

Abdomen oval, dark, dusted above, with dark hairs. Ovipositor very short and broad. T_6 and T_7 fully developed. S_6 and S_8 large and broad. Postgonites, pregonites, phallapodeme and phallapodemite sclerite fused to a rigid, flat, squarish structure. Discrete phallus not present.

Distribution: Not clear. The type species is palaearctic.

Material studied: *Diplotoxa* (*Diplotoxoides*) *dalmatina* (Strobl, 1900) n. comb.

The *Cetema* genus group

Duda (1932—1933) treated *Cetema* Hendel as a subgenus of *Chlorops*. As the male genitalia show, there is no reason to postulate any close relationship between *Cetema* and the *Chlorops* genus group. As I find no indication for a closer relationship to any other genus studied, I prefer to treat *Cetema* as the only representative of a separate genus group.

The *Cetema* genus group is characterized by wings of the *Chloropinae*-type with somewhat procurved r_{4+5} and r_{4+5} and m_{1+2} diverging; black and yellow, relatively narrow body; large, shining frontal triangle; long hairs on t_1 , t_2 and fore and middle tarsi in some males; large epandrium, in rest position bent down under the abdomen and usually with long, dorsal corni; short apically hooked postgonites with 2—4 strong bristles; long pregonites and by a large and usually very broad S_5 in females.

Genus *Cetema* Hendel, 1907: 98

Figs 88, 117 J.

Type species: *Oscinis cereris* Fallén, 1820.

Synonymy: *Centor* Loew, 1866: 7, type species:

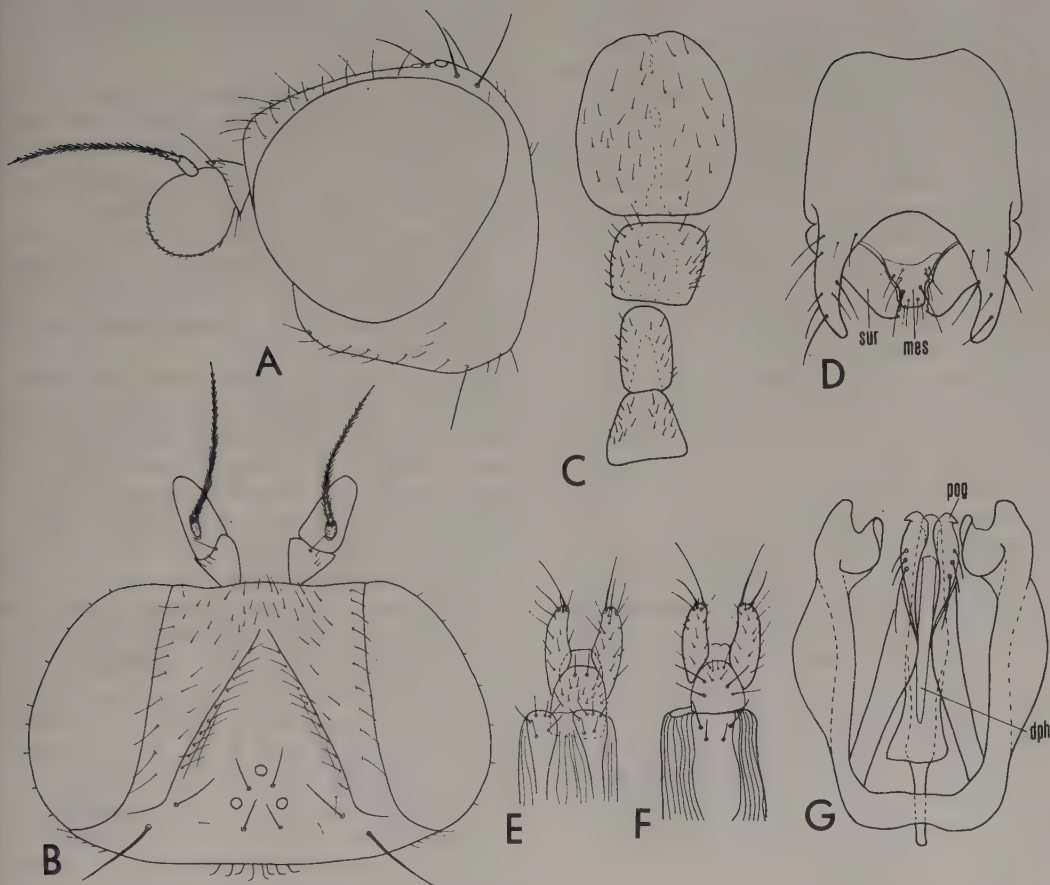


Fig. 88. — A—B. *Cetema cereris* (Fallén). — A. Head, lateral view. — B. Head, dorsal view. — C. *Cetema myopina* (Loew), femal sternites 2—5. — D—G. *Cetema elongata* (Meigen). — D. Epandrium, dorsal view. — E. Apex of ovipositor, dorsal view. — F. Ditto, ventral view. — G. Phallic complex, ventral view.

Oscinis cereris Fallén, 1820 (preoccupied); *Centorella* Strand, 1928: 48, type species: *Oscinis cereris* Fallén, 1820 (Sabrosky 1941).

Medium size, 3—4 mm, black and yellow, rather slender species with large, exposed male hypopygia and very large S_5 in females.

Head long as high, yellow, with frontal triangle and posterior side black and with short bristles. Jowls moderately broad, about as broad as ant_3 , dusted, with one row of pale hairs. vi small, pale. Cheeks linear or invisible. Eyes rounded or broad oval with horizontal or somewhat oblique long axes, and sparse short hairs. Frons somewhat projecting, longer than broad, narrower in front, shining, with numerous *fr*. Frontal triangle of medium size, behind broad as $3/4$ width of frons, with convex side margins reaching about $2/3$ to $3/4$ length of

frons, black, shining, smooth or with some longitudinal ridges behind at sides. *if* distinct in one row on the margin of the triangle, incurved and procurved. *oc* moderately long, procurved, divergent. *pvt* somewhat smaller, procurved, convergent. *vti* as long as *oc*, procurved. *vte* somewhat stronger, outcurved. About 9, short, recurved *orb*. Face receding, with narrow, rather flat carina. Clypeus narrow, yellow or dark, dusted. Proboscis short. Palpi cylindrical, yellow or black. Antennae yellow, partly blackish. ant_2 short. ant_3 rounded squarish, about as long as broad, pubescent. Arista white or black, pubescent to shortly pubescent.

Thorax shining with normal bristles. Humerus with dark spot, without distinct *h*. Mesonotum moderately convex, with shallow

linear depressions along *dc* lines, completely black, with evenly dispersed, very numerous, short, dark hairs arising from more or less stellate granulae, which give mesonotum a rather coarse microsculpture. *a npl* indistinct, 1—2 *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*, all subequal. Scutellum rounded, convex, yellow, black at sides, shining, with few hairs. *ap sc* nearly as long as scutellum. 1 shorter *la sc*. Pleura yellow, with black spots, smooth. *mpl* without hairs. *stpl* with few, pale hairs.

Legs rather long and stout, femora often somewhat thickened, reddish, more or less black, fore tibiae and tarsi usually black. *t₂* ventrally with strong, curved, dark spur. Tibial organ long and narrow. Fore and middle tibiae and tarsi in some species with long, pale hairs on posterior side.

Wings of Chloropinae-type. Halteres yellow or white.

Abdomen long and parallel-sided, in some males strongly downcurved, with segments of various length, blackish, dusted in anterior part above, with dark or pale hairs. Female cerci slender, *S₅* very large often much broader than long. Epandrium large, not retractile, with posterior lateral corners prolonged into curved corni. Middle lobe of surstyli rectangular, serrate at apex. Postgonites short with hook at posterior end and 2—4 strong bristles. Pregonites very long.

Distribution: Holarctic Region.

Material studied: *Cetema cereris* (Fallén); *C. elongata* (Meigen, 1830); *C. myopina* (Loew, 1866); *C. neglecta* Tonnoir, 1931; *C. monticola* Becker, 1910.

Remarks. Nartshuk (1970) studied the types of *Cetema sulcifrons* Duda, 1933, and *Cetema bispinosa* Duda, 1933, both differing in certain characters from the above-mentioned species. *C. sulcifrons* has no corni on the epandrium. *C. bispinosa* has short corni and a long, narrow process on the surstylus. The phallus and gonites were not figured but it was stated that the epandrium is kept bent forward under the abdomen. Therefore it seems probable that these species also belong to *Cetema*.

The *Thaumatomyia* genus group

The *Thaumatomyia* genus group is characterized by *if* in one or more rows on the frontal triangle, flattened scutellum with approximated *ap sc*, more or less convex mesonotum, thin wing membrane with slender veins, discrete,

relatively large, postgonites and discrete pregonites and a long cylindrical or conical distiphallus.

The genus *Thaumatomyia* is closest to the ground-plan condition of Chloropinae with often relatively small eyes, rather simple frontal triangle, moderately convex mesonotum, generalized wings and oval abdomen.

Formosina and *Thressa* differ from *Thaumatomyia* in having strongly convex mesonotum, very large eyes, broad head, granulate middle lobe of surstylus and two strong bristles on the postgonites.

The wings of *Formosina* are similar to those of *Thaumatomyia* and the antennae are simple. Also the presence of abdominal pouches in some males is a common feature although these organs are differently arranged in the two genera. *Formosina* is especially characterized by its very short abdomen.

Thressa is characterized by its pectinate arista, unique within Chloropidae. *Thressa* has a large, rounded frontal triangle and wings more similar to the *Neoloxotaenia*-type with very narrow discal cell and *t_a* in a strongly proximal position. *Thressa* can have black spots on the wings like those in species of *Chromatopterum* Becker.

There are some Oriental species which have wing and head structure very like that of *Thressa*, except that they have a normal arista (fig. 93). They could belong to the African genus *Homops* Speiser or to *Chromatopterum* Becker. Unfortunately I have no males available.

Genus *Thaumatomyia* Zenker, 1833: 344

Type species: *Chlorops notata* Meigen, 1830 (as *Thaumatomyia prodigiosa* Zenker, 1833).

Small to medium size, 2.0—3.5 mm, *Chlorops*-like yellow species with black or red markings, almost naked or hairy mesonotum, flat scutellum, closely approximated *ap sc* and *if* in one or more rows on the surface of the frontal triangle.

Head higher than long, yellow, or brown with darker markings and short dark bristles. Eyes oval with vertical long axes, with sparse, short hairs. Jowls narrow to broad, from width of *t₁* to broader than *ant₃*, with one row of pale hairs. *vi* absent or short, dark. Cheeks not visible to narrow. Frons somewhat projecting, broad as long, not dusted, with few to numerous *fr*. Frontal triangle large, behind almost

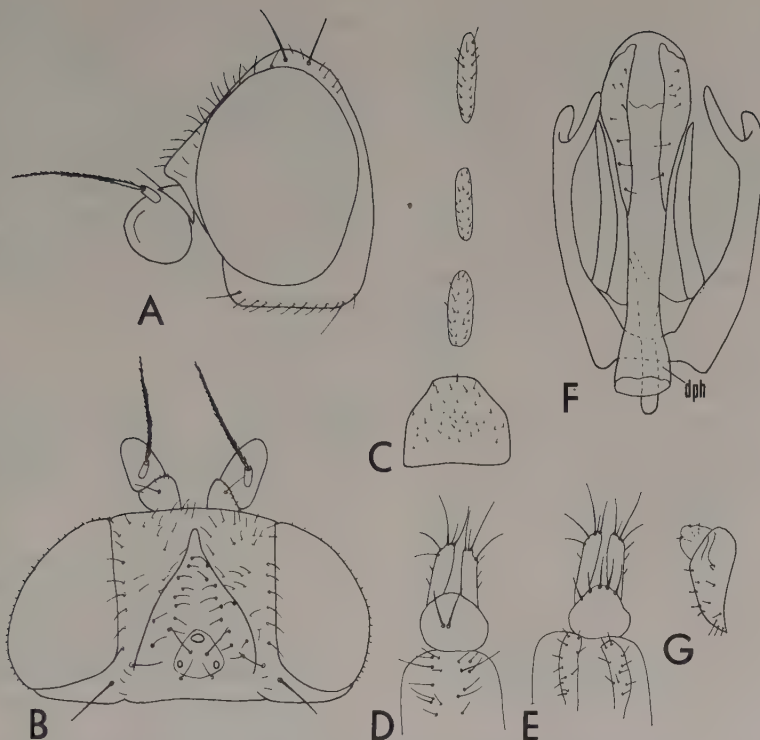


Fig. 89. — A—G. *Thaumatomyia notata* (Meigen). — A. Head, lateral view. — B. Head, dorsal view. — C. Female sternites 2—5. — D. Phallic complex, ventral view. — E. Apex of ovipositor, dorsal view. — F. Ditto, ventral view. — G. Right surstylus, ventral view.

as broad as frons, with straight or somewhat convex side margins reaching to or almost to front of frons, smooth, shining, more or less darkened with 1 or more rows of *if* on the surface, and sometimes a longitudinal carina or a depression on anterior part. *oc* and vertical bristles of different length in different species but usually small to indistinct. *oc* short, procurved, divergent. *pvt* short, procurved, convergent. *vii* short to indistinct, incurved, *vte* short to indistinct, outcurved. About 8 small, recurved *orb*. Face concave with a narrow triangular indistinct carina. Epistomal field present. Clypeus more or less darkened, shining. Proboscis normal. Palpi cylindrical yellow. Antennae yellow to black. *ant*₂ short with distinct bristle. *ant*₃ rounded to squarish, usually longer than broad, pubescent. Arista dark with very short pubescence.

Thorax shining with distinct bristles. Humerus with dark spot and 0—1 *h*. Mesonotum rather convex, with five longitudinal black or red stripes, smooth, shining, with shallow depressions along *dc* lines, almost bare or evenly covered with short, dark hairs. 0—1

a npl, 1—2 *p npl*, 1 *a pa*, 0—1 *p pa*, 0—1 *dc*. Scutellum rounded or somewhat triangular, flat, yellowish shining, bare or with numerous dark hairs. *ap sc* almost as long as scutellum, straight, close together. 1—3 *la sc*. Pleura smooth, shining, with more or less distinct spots. *mpl* with few pale hairs. *stpl* with few pale hairs.

Legs simple, yellow, partly darkened, *t*₃ with large oval tibial organ.

Wings of Chloropinae-type, rather thin and transparent. Subcostal cell broadened. *t*_a distinctly proximally of tip of *r*₁ but reaching discal cell in distal half. Halteres yellow or bony white.

Abdomen oval, yellow, more or less darkened above, dusted above, with dark and pale hairs. Female cerci slender. Middle lobe of surstylus with nail- or hook-shaped apex. Postgonites rather short and broad or long. Pregonites short or very long and slender. Distiphallus long, cylindrical or trumpet-shaped. Males of some species (*T. flavifrons* Macq., *T. sulcifrons* Beck.) have a large eversible pouch on either side of the pregenital segment.

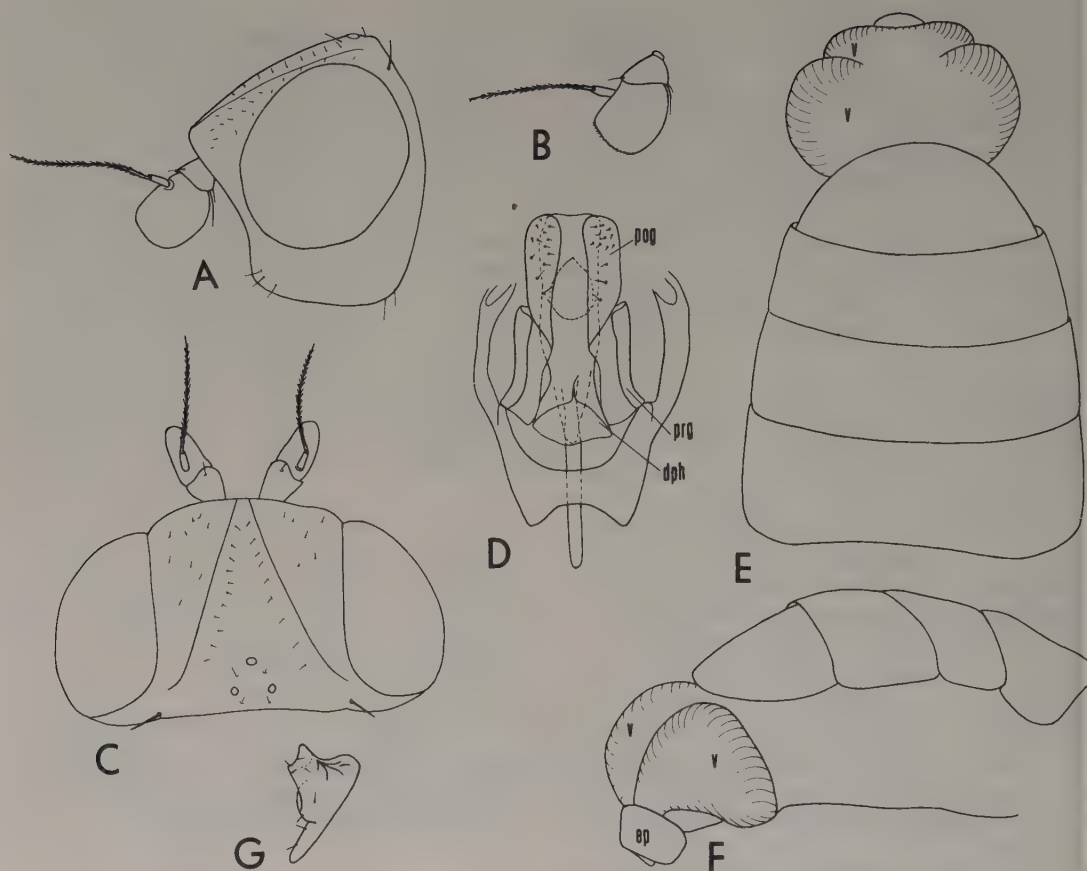


Fig. 90. — A—G. *Thaumatomyia (Chloropisca) glabra* (Meigen). — A. Head, lateral view. — B. Antenna, inner side. — C. Head, dorsal view. — D. Phallic complex, ventral view. — E. Ditto, dorsal view. — F. Ditto, lateral view. v = abdominal vesica. — G. Right surstylus, ventral view.

Pouches in *T. (C.) glabra* Meig. are even larger and confluent dorsally.

Bionomics. The larvae prey on root-living aphids and coccids.

Distribution: *Thaumatomyia* (including *Chloropisca*) has been reported from all regions. Even though many of these records need confirmation, the genus undoubtedly has a wide distribution.

Subgenus *Thaumatomyia* Zenker, 1833

Figs 89, 118 A.

The species of *Thaumatomyia* s. str. differ from those of *Chloropisca* in the following characters: *vi* present. *oc*, *orb* and vertical bristles stronger. Mesonotum and scutellum with distinct hairs. 1 *h*, 1 *a npl*, 2 *p npl*, 1 *p pa*, 1 *dc*.

Material studied: *Thaumatomyia notata* (Meigen); *T. rufa* (Macquart, 1835); *T. hallandica* Andersson, 1966; *T. trifasciata* (Zetterstedt, 1848); *T. flavifrons* (Macquart, 1835); *T. sulcifrons* Becker, 1907.

Subgenus *Chloropisca* Loew, 1866: 79

Figs 90, 118 B.

Type species: *Chlorops glabra* Meigen, 1830.

The type species of *Chloropisca* differs from the *Thaumatomyia* species only in the following characters: *vi* absent, *vte* distinct, other head bristles very minute. *if* in one row. Mesonotum and scutellum almost naked, only with very few and minute hairs. No *h*, no *a npl*, 1—2 *p npl*, 1 *a pa*, no *p pa*, no *dc*. r_{4+5} slightly recurved. The male genitalia pouches confluent on the dorsal side of abdomen.

Material studied: Thaumatomyia (Chloropisca) glabra (Meigen).

Remarks. The differences between the subgenera are very small and mainly restricted to a general reduction of the macrochaetae in the species *glabra*. In species of *Thaumatomyia* s. str., such as *trifasciata* and *sulcifrons*, some of the bristles are also strongly reduced. The male genitalia of *glabra* are well within the range of variation of *Thaumatomyia* s. str.

Genus *Formosina* Becker, 1911: 78

Figs 91, 118 C.

Type species: Chloropisca lucens de Meijere, 1908 (Sabrosky 1941).

Synonymy: Coomanimyia Séguy, 1948: 102, type species: *Coomanimyia ops* Séguy, 1938 (Sabrosky 1941).

Small, 2—3 mm, black species with yellow markings and very high thorax, flat scutellum and extremely short and broad abdomen.

Head higher than long, mostly dark with short, dark hairs and bristles. Eyes oval, higher than long, with vertical long axes, naked. Jowls very narrow to almost linear with one row of peristomal bristles and distinct *vi*. Cheeks not visible in lateral view. Face concave, vibrissal angle and front of frons therefore somewhat projecting. Frons very sloping, narrower than long, narrower in front than behind, brownish, silky shining with some very short *fr*. Frontal triangle large, behind as broad as frons, with straight or somewhat incurved side margins and pointed tip reaching front of frons, smooth, shining, brown to black, with one longitudinal ridge at each side and a somewhat shallow depression in the middle. *if* in one row on the margin of the triangle. Ocellar tubercle situated behind, immediately anterior of the vertical ridge. *oc* short, procurved, divergent. *pvt* about twice as long as *oc*, upright, cruciate. *vti* smaller than *oc*, incurved. *vte* about as *pvt*, outcurved. About 8 distinct, recurved *orb*. Occiput dark. Face without distinct carina. Clypeus broad, black, dusted. Proboscis short. Palpi short, cylindrical. Antennae inserted at middle of head. *ant*₂ somewhat prolonged. *ant*₃ rounded, below longer than above, shortly pubescent. Arista very long and slender, naked, yellowish at base, flagellum black.

Thorax short, broad and high. Humerus dark, without spot, with 1 *h*. Mesonotum brownish-black to black with darker longitudinal stripes and with shallow grooves along

dorso-central line, very thinly dusted, subshining, with a few evenly dispersed, very short, dark hairs. A large triangular area present from the notopleural ridge upwards and anterior of the transverse suture. Thoracic bristles moderately long. 1 *a npl*, 1 *p npl*, 1 *a pa*. *p pa* and *dc* indistinct. Scutellum longer than broad, thick, pointed, flat above and below, faintly dusted, on the disc and the broad margins covered by pale hairs. 1 pair of moderate long *ap sc*, closely approximated. Pleura smooth, extremely faintly dusted, brownish with darker spots. *mpl* naked with one dark spot and upper posterior corner yellow. *stpl* with few hairs.

Legs short, slender, simple, more or less darkened. Tibial organ distinct.

Wings of *Thaumatomyia*-type with very thin, clear membrane. Halteres with yellow knob.

Abdomen very short and broad, broader than long, black or more or less yellow, dusted above, with dark hairs. Tergites broadly infolded. Sternites small, the posterior one almost reduced. Male abdomen with three pairs of protrusible, tube-like appendages, which are probably pheromone-producing organs. Male genitalia of *Thaumatomyia*-type. Middle lobe of surstylus with granulated apex. Mesolobus with 1 pair of strong bristles. Postgonites long with 2 strong bristles at anterior end. Pregonite narrow, connecting postgonite with hypantrium. Distiphallus rather long, cylindrical.

Distribution: Species of *Formosina* are recorded from the Oriental and Australian Regions.

Material studied: Formosina lucens (de Meijere).

Remarks. Many of the species described in *Formosina* have a large, in front rounded frontal triangle like that of *Thressa* and wings of the *Thressa*-type. I think the generic status of these species should be evaluated in connexion with a revision of the genera *Homops* Speiser, 1923, and *Chromatopterum* Becker, 1910, which seem closely related with *Thressa*.

Genus *Thressa* Walker, 1860: 146

Figs 92, 118 D.

Type species: Thressa signifera Walker, 1860.

Synonymy: Chalcidomyia de Meijere, 1910: 156, type species: *Chalcidomyia punctifera* de Meijere, 1910 (as *Chalcidomyia beckeri* de Meijere, 1913); *Hemisphaerisoma* Becker, 1911: 47, type species: *Hemisphaerisoma politum* Becker, 1911 (Sabrosky 1941); *Uranucha* Czerny, 1903: 127,

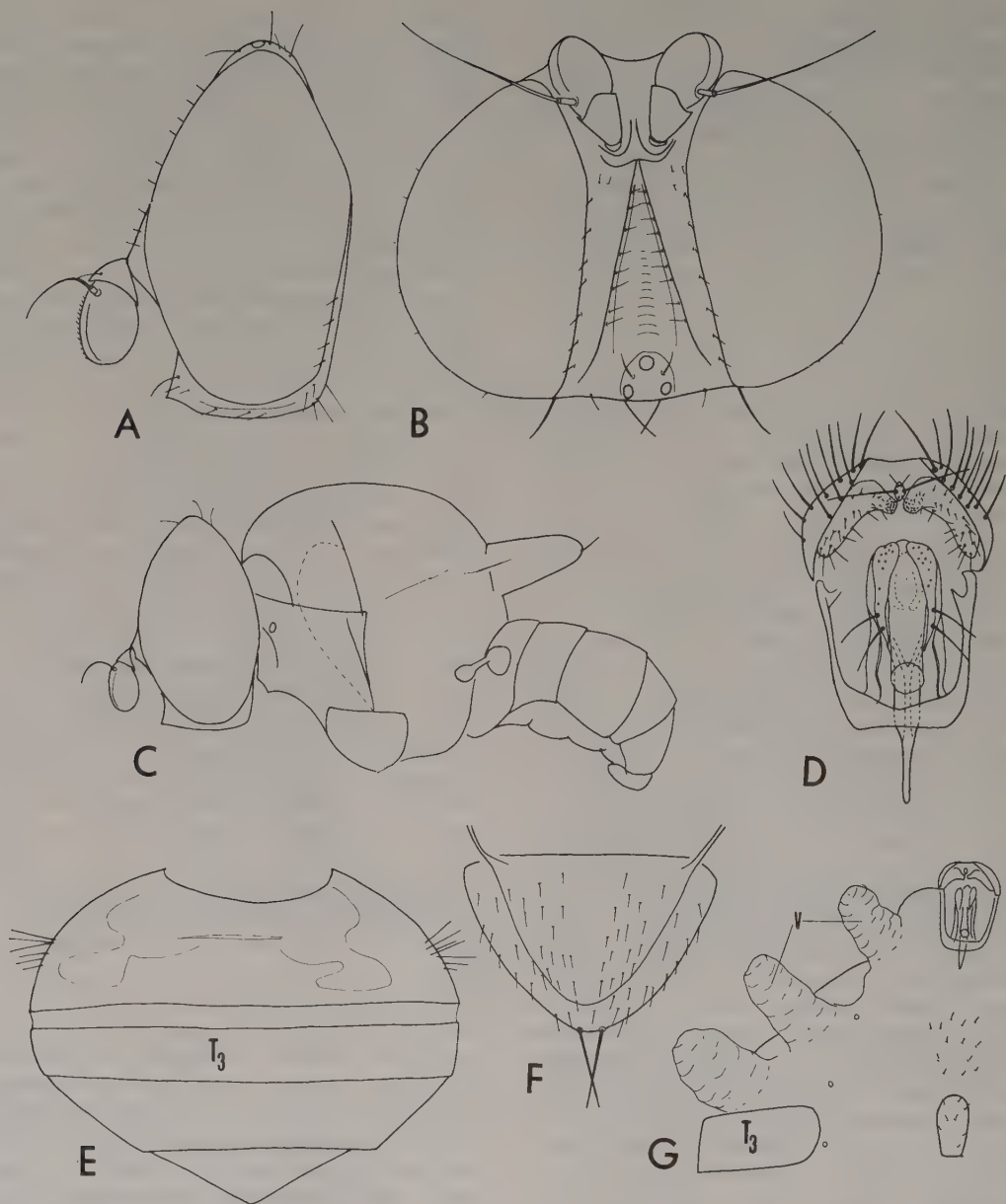


Fig. 91. — A—G. *Formosina lucens* (de Meijere). — A. Head, lateral view. — B. Head, dorsal view. — C. Head, thorax, abdomen, ♂, lateral view. — D. Male genitalia, ventral view. — E. Male abdomen, dorsal view. — F. Scutellum, dorsal view. — G. Male abdomen, ventral view. —v = abdominal vesica.

type species: *Geomyza spuria* Thomson, 1868 (Sabrosky 1964).

Small, 1—2 mm, shining, black species with large rectangular frontal triangle and pectinate arista.

Head higher than long, very large and broad,

broader than thorax, black, with very short dark bristles. Eyes large, in side view covering almost the whole head, rounded oval with vertical long axes and sparse short hairs. Jowls linear with one row of dark hairs. *vi* small, dark. Cheeks not visible. Frons slightly project-

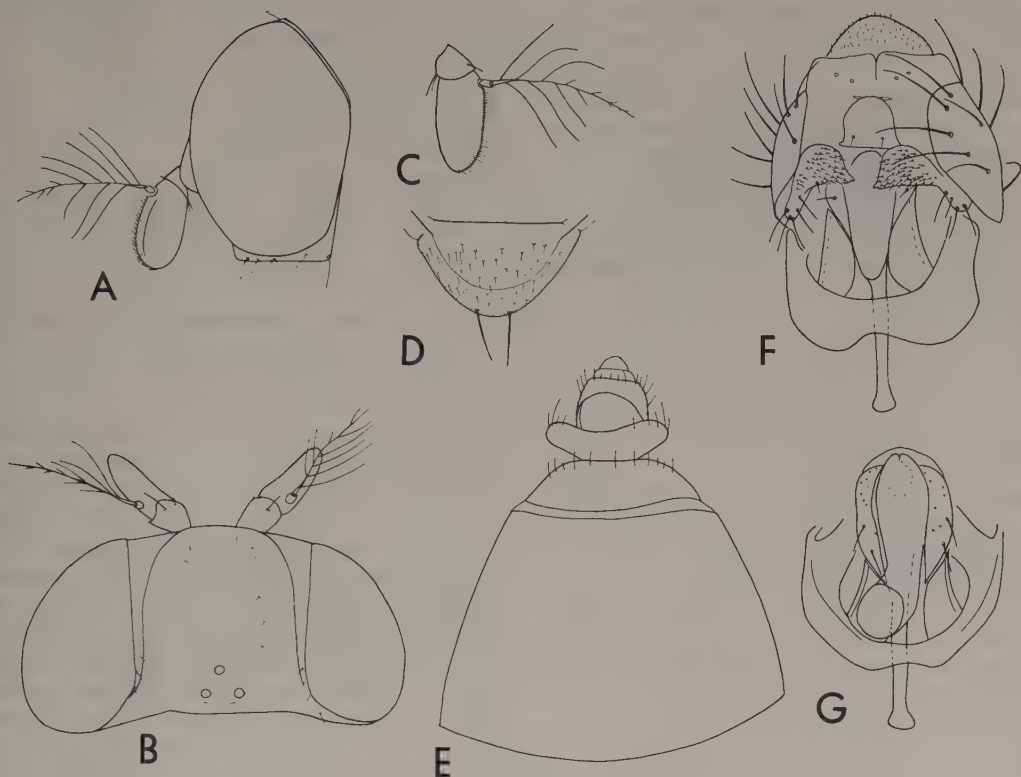


Fig. 92. — A—G. *Thressa punctifera* (de Meijere). — A. Head, lateral view. — B. Head, dorsal view. — C. Antenna, inner side. — D. Scutellum. — E. Apical end of male abdomen, dorsal view. — G. Phallic complex, ventral view.

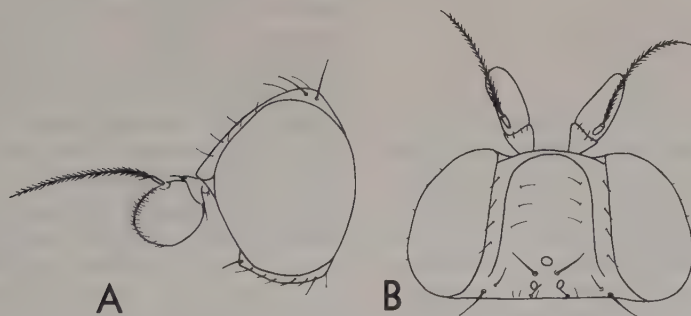


Fig. 93. — A—B. ?*Homops* sp. — A. Head, lateral view. — B. Head, dorsal view.

ing, longer than broad, subshining without *fr*. Frontal triangle covering almost the whole frons, behind broad as frons, in front somewhat narrower, reaching front of frons, smooth, shining, black with metallic lustre. Extremely short *if* in one row on the surface of the triangle. Ocellar tubercle small with small ocelli. *oc* extremely small, divergent. *pyi* small,

hair-like upright, convergent. *vti* indistinct. *vte* small, outcurved. Few indistinct, upright *orb*. Face shining, somewhat concave with very indistinct carina. Clypeus shining, black. Proboscis short. Palpi short, dark. Antennae brownish, more or less darkened. *ant*₂ short. *ant*₃ oval, about twice as long as broad, distinctly pubescent. Arista dark, not pubescent

but with 5—6 long dorsal hairs and 3 long ventral hairs, and apically with some short hairs.

Thorax short and high, black, shining, with short dark hairs and bristles. Humerus dark without distinct *h*. Mesonotum strongly convex, with granulated microsculpture, evenly covered with short hairs. No *a npl*, 1 *p npl*, 1 *a pa*, no *p pa*, no *dc*. Scutellum short, rounded, thick, basally flat, shining with numerous dark hairs. *ap sc* short, usually distinctly shorter than scutellum. Pleura smooth, shining, black. *npl* with few hairs. *mpl* without hairs. *stpl* with very few basal hairs.

Legs short and simple, dark, partly yellowish. Tibial organ oval, distinct.

Wings small, narrow, with thin iridescent membrane, sometimes with black spots basally, along costa and at tip. *t_a* near the base of the wing, distinctly proximally of tip of *r₁* and in basal half of discal cell. Halteres with dark stem and yellow knob.

Abdomen short and broad, black, shining, sometimes with bluish or greenish lustre, with short hairs. *T₁₊₂*, *T₄* and *T₅* short. *T₃* long, longer than the other tergites together. Surstyli with conical, granulated middle lobe. Postgonites rather long, pregonites short. Distiphallus long and downcurved at apex.

Distribution: Oriental Region.

Material studied: *Thressa punctifera* (de Meijere).

The *Cryptonevra* genus group

The status of the *Cryptonevra* genus group is somewhat doubtful. The general shape of the *Cryptonevra* species are *Scoliophthalmus*-like. The male genitalia are similar to those of the *Eutropha* genus group with granulate middle lobe of surstylus, short postgonites and long pregonites. The basiphallus of *C. flavitarsis* (Meig.) and *C. diadema* (Meig.) are large and complex and so is the distiphallus. Other differences are the well developed bristles and the flat thorax with the coarse microsculpture of *Cryptonevra*.

Probable members of the *Cryptonevra* genus group are the genus *Xena* Nartshuk, 1964 (type species: *Xena straminea* Nartshuk, 1964), with a complex phallus and a *Cryptonevra*-like head (fig. 95) and *Homalura* Meigen, 1826 (type species: *Homalura tarsata* Meigen, 1826) with similar male genitalia (fig. 95). *Homalura* is characterized by very coarse, granulate

microsculpture on the thorax and large punctures on the frontal triangle.

Genus *Cryptonevra* Lioy, 1864: 1125

Figs 94, 118 E.

Type species: *Chlorops flavitarsis* Meigen, 1830.

Synonymy: *Haplegis* Loew, 1866: 22, type species: *Chlorops diadema* Meigen, 1830 (as *Haplegis rufifrons* Loew, 1866); *Cryptoneura* Enderlein, 1911: 185 (emendation) (Sabrosky 1941).

Small, 2—3 mm, predominantly black species.

Head high as long, black or with jowls, face and frons yellowish. Head bristles well developed, black, hairs black or white. Eyes rounded oval with almost horizontal long axes and very few short hairs. Jowls about as broad as height of *ant₃*, hairy. Postoccular ciliation in one row down to *p pst. vi* distinct. Cheeks not visible from side. Frons slightly projecting, longer than broad, shining, with few *fr*. Frontal triangle large, broad behind, with straight side margins almost reaching front of frons, with reticulate microsculpture or almost smooth, not dusted, usually with a narrow groove from the anterior ocellus to the tip. *if* distinct, incurved and procurved, in one row on the margin of the triangle. *oc* short, procurved, divergent, *pvt* short as *oc*, procurved, parallel to slightly convergent. *vti* short, incurved. *vte* stouter, about 3 times as long as *oc*. *orb* 6—9, in one distinct row, recurved. Vertex rather sharp-edged. Face concave. Facial carina present, triangular between antennae and narrow below, reaching epistoma. Clypeus black, shining. Proboscis short. Palpi short, slender. Antennae brownish or black. *ant₂* short. *ant₃* about as long as broad, with pointed upper corner. Arista brownish to black, short, slender, naked or with short pubescence.

Thorax black, narrower than the head, with distinct bristles. Humeri black with 1 *h*. Mesonotum black with faint, granulate microsculpture, subshining, dusted, evenly covered by numerous short hairs. 1 *a npl*, 2 *p npl*, 1 stout *a pa*, 1 *p pa*, 1 *dc*. Scutellum rounded, convex, black, dusted, with hairs on the disc. *ap sc* about as long as length of scutellum. 1 *la sc*. Pleura black. Propleura and anterior half of *mpl* shining. *mpl* naked. *stpl* dusted below, with few hairs along upper margin. Other pleura dusted.

Legs simple, black, partly yellow, especially the tarsi. Tibial organ present.

Wings of Chloropinae-type, sometimes whitish with pale veins.

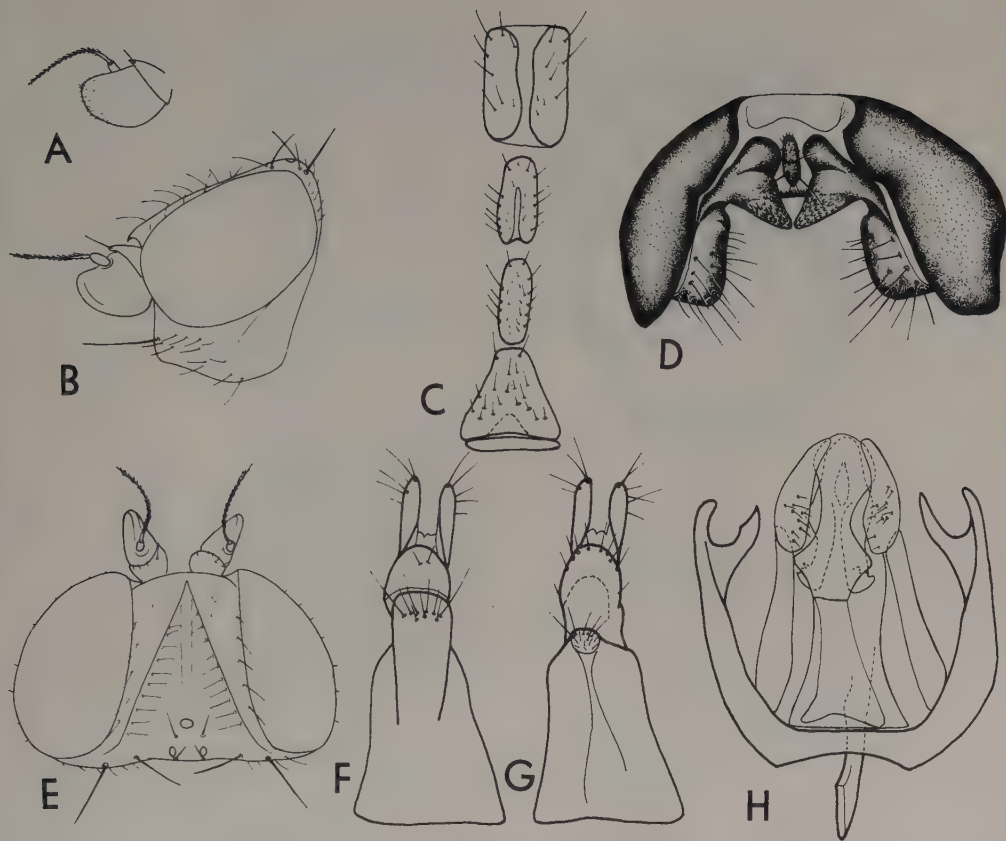


Fig. 94. — A—H. *Cryptonevra flavitarsis* (Meigen). — A. Antenna, inner side. — B. Head, lateral view. — C. Female S_1 — S_5 . — D. Male epandrium, ventral view. — E. Head, dorsal view. — F. Apex of female ovipositor, dorsal view. — G. Ditto, ventral view. — H. Phallic complex, ventral view.

Abdomen narrowly ovoid, black, dusted above, with black hairs. Female cerci normal, fifth sternite much broader than the preceding, parted. Middle lobe of surstylus conical, granulate. Postgonites short, connected with the longer pregonites. Basiphallus long, below with coronated sclerites. Distiphallus long, bilobed.

Distribution: Palaearctic Region.

Material studied: *Cryptonevra flavitarsis* (Meigen); *Cryptonevra diadema* (Meigen); *Cryptonevra tarsata* (Fallén, 1820).

Remarks: *Cryptonevra tarsata* (Fall.) has a shorter, simple phallus and longer postgonites.

The *Eutropha* genus group

The *Eutropha* genus group is characterized by its male genitalia which have well-developed

mesolobus, distinctly three-lobed surstyli, short rather broad postgonites, long slender pregonites, at their anterior ends usually with a knob. The middle lobe of the surstylus has the apical end long, incurved and granulate or serrate. The bristles of the head and thorax are usually short or very short. The *ap sc* are approximated.

The species of *Eutropha* and *Bathyparia* seem to be confined to coastal sand dunes. They are very much alike in general shape, have shining frontal triangle and both have white hairs and bristles, which is a common feature of species living on sand dunes. The principal differences are present in the hairiness of mpl and in the shape of ant₃.

Cerais and *Pemphigonotus* form another group of dull, dusted species, more similar in general shape. The ecological requirements of *Pemphigonotus* are not known. Species of

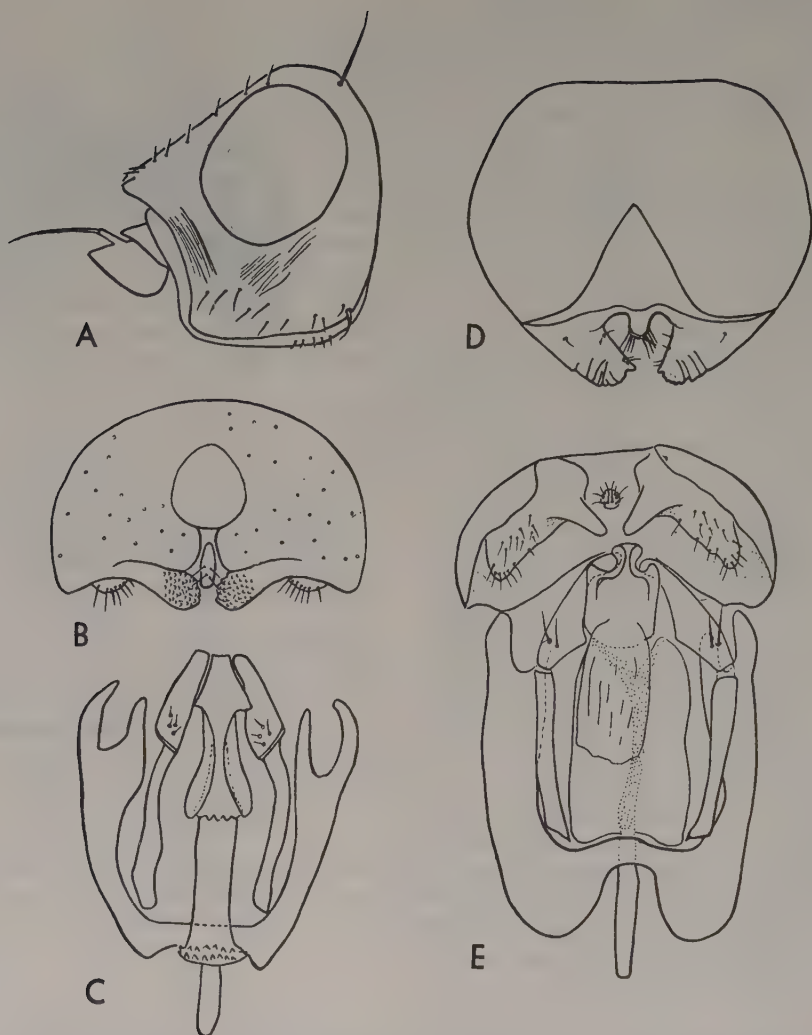


Fig. 95. A—C. *Xena straminea* Nartshuk (after Nartshuk 1964). — A. Head, lateral view. — B. Epandrium, posterior view. — C. Phallic complex, ventral view. — D—E. *Homalura tarsata* Meigen (after Nartshuk 1966). — D. Epandrium, posterior view. — E. Male genitalia, ventral view.

Cerais are not found on coastal sand dunes. *Cerais magnicornis* v. d. Wulp was caught in the central part of Sumatra and my specimens of *C. trifasciata* de Meij. were taken inland in indigenous forest usually near streams. Differences between these genera are also found in the hairness of mpl and in the shape of ant₃ (rounded, about as long as high in *Pemphigonotus*).

It should be noted that the *Eutropha* genus group will also be extended to include species

more similar to *Chlorops* s. str. Among my chloropids from Sri Lanka there is a species with male genitalia which are the same as the *Eutropha*-type. This inland species is like a small, dusted, brownish, indistinctly spotted *Chlorops* with well-developed black bristles on head and thorax and without hairs on mpl. It probably represents a separate genus. Because I am not sure whether or not this species has already been described here it will not be treated any further.

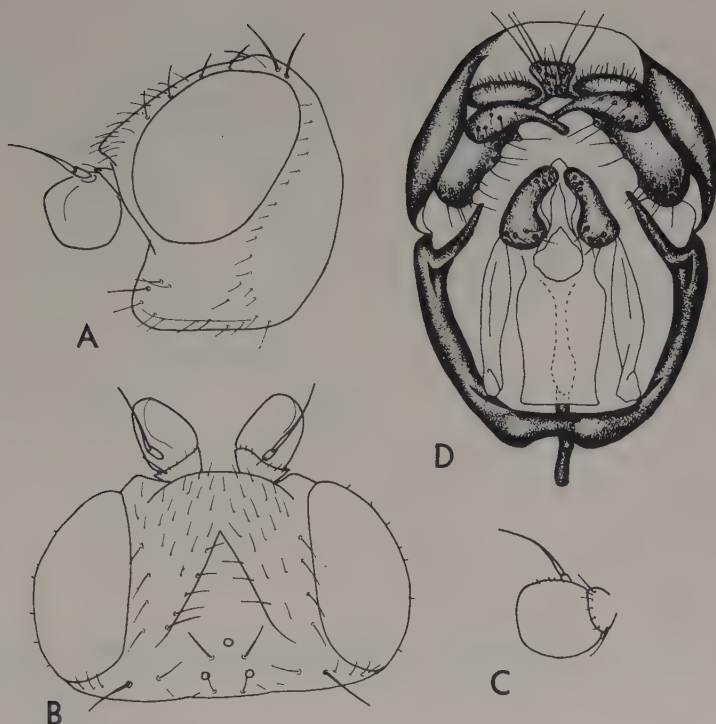


Fig. 96. — A—D. *Eutropha fulvifrons* (Haliday). — A. Head, side view. — B. Head, dorsal view. — C. Antenna, inner side. — D. Male genitalia, ventral view.

Genus *Eutropha* Loew, 1866: 26

Figs 96, 118 F.

Type species: Chlorops fulvifrons Haliday, 1833.

Synonymy: Pseudoformosina Malloch, 1938: 355,
type species: *Chlorops nicobarensis* Schiner, 1868
(Sabrosky 1941).

Small species, 2—3 mm, black with brown to yellow markings, white bristles and hairs, and very short arista.

Head as long as high with short bristles, yellow or brown, sometimes with black frontal triangle and occiput. Eyes broad oval or oval with oblique or almost horizontal long axes, naked or with very few short hairs. Jowls very broad, distinctly broader than ant_3 and usually broader than half height of eye, dusted, with pale hairs in one row or hairs spread over the jowls. Vibrissal angle straight or somewhat projecting. *vi* distinct, pale. Cheeks narrow. Frons somewhat projecting, usually longer than broad, shining, brown or yellowish with numerous *fr*. Frontal triangle of moderate size, black, yellow, or black with yellow margins, smooth, shining, with straight or somewhat concave side margins reaching $1/2$ — $2/3$ length

of frons. Ocellar tubercle sometimes dusted. *if* in one row along the margins of the triangle. *oc* short, slender, procurved, divergent. *pvt* small, procurved, convergent. *vti* and *vte* equal, distinctly stronger than *oc*. *orb* 5—7, recurved. Face straight or concave. Facial carina narrow, distinct between the antennae, reaching to middle of face. Clypeus yellow or black, shining. Proboscis short. Palpi short, slender. Antennae yellow to black. ant_2 short. ant_3 rounded squarish, about long as high. Arista very short, shorter than antennae. Basal segments of arista appearing rather thick and contrasting with the very slender, very shortly pubescent flagellum.

Thorax with short bristles. Humerus without distinct *h*. Mesonotum moderately convex, smooth, shining or with pale dust or dusted with longitudinal shining stripes, evenly covered with short white hairs. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 indistinct *p pa*, 1 *dc*. Scutellum brown to pale yellow, rounded, convex or flat, dusted, with hairs on the disc. *ap sc* at least long as half length of scutellum, often straight and distinctly approximated. At most 1 small *la sc*. Pleura smooth. *npl* dusted. *prpl* shining. *mpl*

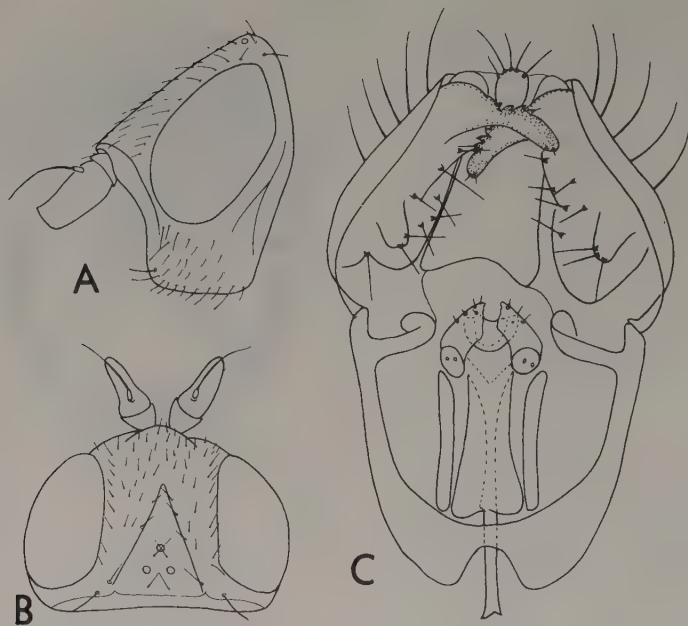


Fig. 97. — A—C. *Bathyparia praeclara* Lamb. — A. Head, lateral view. — B. Head, dorsal view. — C. Male genitalia, ventral view.

shining, more or less dusted in posterior half, without hairs. ptpl shining. hpl dusted. mn shining or dusted.

Legs simple. t_2 with spur. Tibial organ well developed, oval.

Wings of *Chlorops*-type with relatively slender veins. m_{1+2} thin, straight or recurved.

Abdomen oval, dusted above. Male genitalia with pointed, hook-like middle lobe of surstylus. Postgonites short, curved. Pregonites straight, narrow, with a knob at anterior end, connecting postgonites and hypandrium.

Distribution: *Eutropha* is distributed throughout Europe, Asia, Africa and the Pacific. For a key to the species see Sabrosky (1972).

Material studied: *Eutropha fulvifrons* (Hali-day); *E. siploidea* (Duda, 1930); *E. flavomaculata* (Duda, 1930).

Genus *Bathyparia* Lamb, 1917: 56

Figs 97, 118 G—H.

Type species: *Bathyparia praeclara* Lamb, 1917.

Species small, 2.5—3.0 mm, black with head and scutellum yellow and with silvery white hairs and bristles.

Head yellow or brownish-yellow, behind black, with short bristles. Eyes small, oval

with vertical long axes, naked. Jowls very broad, broader than half the height of eyes, dusted, with numerous white hairs covering most of the surface. *vi* indistinct, hair-like. Cheeks broad with hairs almost up to frons. Frons somewhat projecting, longer than broad, shining, brownish yellow, with numerous white *fr*. Frontal triangle small, behind only as broad as half width of frons, with slightly incurved side margins reaching to about middle of frons, yellowish, smooth and shining. Ocellar tubercle black. *if* long as *fr*, incurved and procurved, in one row along the margin. *oc* short as *if*, upright, cruciate. *pvt* about as long as *oc* or a little longer, procurved, convergent or cruciate. *vii* and *vte* somewhat stronger than the other head bristles. *orb* 8—9, indistinct, procurved. Face narrow, concave with a narrow carina reaching half-way down face. Clypeus black, shining. Proboscis short. Palpi short, darkened, with white hairs. Antennae brownish-yellow or yellow. ant_2 short. ant_3 squarish, longer than broad (ratio about 2:1), with short, white pubescence in apical half. Arista short, as long as ant_3 , yellowish at base, white and black towards the tip, naked.

Thorax black, with short, white bristles and somewhat scale-like silvery-white hairs. Humeri black without distinct *h*. Mesonotum rather

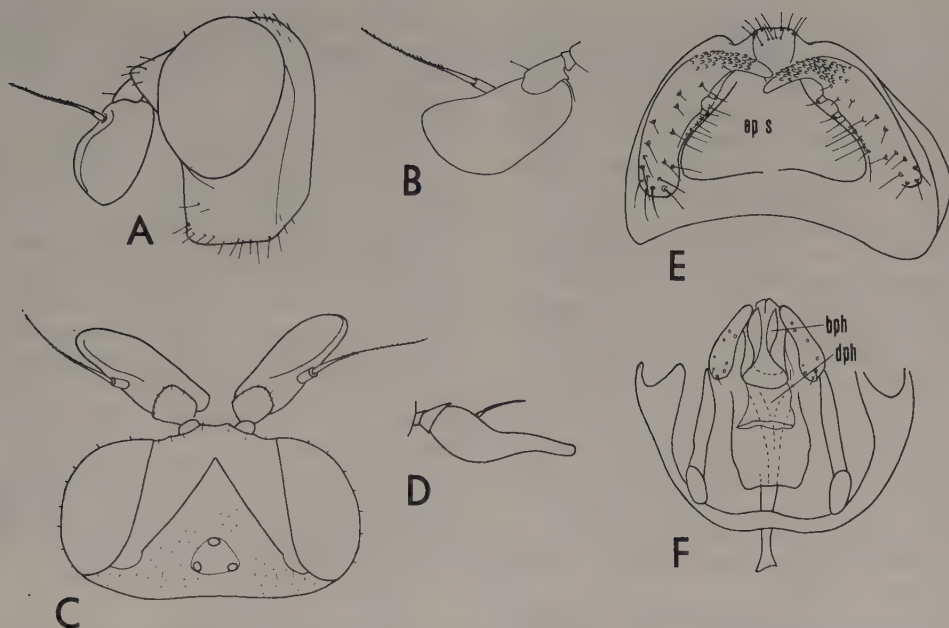


Fig. 98. — A—C, E—F. *Cerais trifasciata* (de Meijere), ♂. — A. Head, lateral view. — B. Antenna, inner side. — C. Head, dorsal view. — D. *Cerais magnicornis* v. d. Wulp, antenna, male, from van der Wulp, 1877, redrawn. — E. Epandrium, ventral view. — F. Phallic complex, ventral view.

strongly convex, black, smooth, partly shining but with white dust at sides in front of scutellum and along dorso-central lines. The whole mesonotum evenly covered with adpressed, scale-like, silvery-white hairs. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 indistinct, hair-like *p pa*, 1 *dc*. Scutellum rounded, convex, yellow narrowly black at base, dusted, covered with numerous white hairs. *ap sc* strong, close together, long as length of scutellum. Pleura black. *mpl* shining, with rather distinct microsculpture and numerous long, white hairs. *stpl* smooth, with numerous white hairs. *hpl* shining. Metanotum shining, with reticulated microsculpture.

Legs short, simple, yellow, largely darkened. Distinct, narrow tibial organ present.

Wings of Chloropinae-type, m_{1+2} recurved, r_{2+3} very short and r_{4+5} procurved in male, normal in female. Halteres white.

Abdomen ovoid, black, dusted on dorsal surface, with white hairs. Female cerci short, sternites small and narrow. Male genitalia of *Eutropha*-type. Middle lobe of surstylus serrate. Pregonites without distinct knob on anterior end.

Distribution: *Bathyparia* is known only from South Africa.

Material studied: *Bathyparia praeclara* Lamb.

Genus *Cerais* van der Wulp, 1881: 54

Figs 98, 118 J.

Type species: *Cerais magnicornis* van der Wulp, 1881.

Synonymy: *Euryparia* Becker, 1911: 84, type species: *Euryparia rara* Becker, 1911, n. syn.

Small to medium sized species, length 2.0—3.0 mm. Habitus *Eutropha*-like. Male sex with very large *ant*₃. General colour blackish-brown, body dusted with extremely short, white hairs and bristles.

Head higher than long, brownish-white with brown and black areas, and very short white hairs and bristles. Eyes rounded, semispherical, naked or with very few short hairs. Jowls broad, about as broad as half height of eye with numerous pale hairs on the surface. *vi* indistinct. Cheeks not visible from the side. Frons shortly projecting, dusted, with few, small, pale *fr*. Frontal triangle large, behind nearly as broad as frons, with straight side margins reaching 4/5 length of frons, brownish, smooth, with distinct dust, except on a narrow shining stripe from front ocellus to the tip. *if* small, in one row on the margin of the triangle. *oc*, *pvt*, *vti*, *vte* very small, indistinct, hair-like. Face concave, without carina. Cly-

peus black, shining. Proboscis short. Palpi slender, dark, with pale hairs. Antennae brownish. ant₁ visible, short. ant₂ small, longer than high. ant₃ in male very large, squarish, broader at apex or long, narrow, sinuate, with distinct pubescence. Basal segments of arista yellow, flagellum narrow, white, pubescent.

Thorax brownish with darker markings, almost completely covered with brown or grey dust. Humeri brownish without distinct *h*. Mesonotum dark brown with shallow impressions along dorso-central lines. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*. Scutellum rounded, convex, brownish, dusted, with numerous hairs on surface and margins. Small hair-like *ap sc* and some hair-like *la sc*. Pleura brown, with dark spots, mostly with grey dust. Subspiracular callus shining, brown. mpl naked. stpl with white hairs and a shining spot in front.

Legs rather long and stout, brownish, t₃ with a narrow tibial organ.

Wings of Chloropinae-type, short and broad, partly brownish with rather thick veins. m₁₊₂ recurved. Halteres white.

Abdomen ovoid, brown, dusted, with pale hairs. Male genitalia very similar to those of *Eutropha*.

Distribution: Indonesia, Formosa, Sri Lanka and the U.S.S.R.

Material studied: *Ceraïs trifasciata* (de Meijere, 1910) n. comb. (*Anthracophaga t.*), from Sri Lanka.

Genus *Pemphigonotus* Lamb, 1917: 54

Type species: *Pemphigonotus mirabilis* Lamb, 1917.

Synonymy: *Minda* Paramonov, 1956: 779, type species: *Minda rubra* Paramonov, 1956 (Sabrosky 1964).

The type species, which I have not seen, was described as having a remarkable sex-dimorphism, that is, the male has a large, swollen scutellum and broad wings with strongly arched costa while the female is normal. Sabrosky (1940) transferred *Chlorops rubra* de Meijere, 1910, *Chlorops paludosa* de Meijere, 1910, *Chlorops debeaufortii* de Meijere, 1913, and *Chlorops ochrostoma* Becker, 1911, to *Pemphigonotus*. I have seen the specimens of these species in Amsterdam and they undoubtedly belong to the same genus. I have studied the male genitalia of one of the males from Sinabang, Simalur, placed under the name *Chlorops sinabangensis* de Meijere (n. coll., description

probably unpublished) in the Zoological Museum, Amsterdam, and probably conspecific with *Chlorops ochrostoma* Becker (cf. Sabrosky 1940: 422).

The male genitalia are very similar to those of *Eutropha* with hairy posterior lobe of surstylus, granulated apical end of the middle lobe and a distinct knob at the anterior end of the pregonite. The differences between *Pemphigonotus* and *Eutropha* are that *Pemphigonotus* has longer legs and the mpl and stpl are dusted and covered with dense hairs. *Bathyparia* has hairy mpl and stpl, all hairs and bristles being stout and silvery-white, while the hairs of *Pemphigonotus* are normal, small, slender and dark to yellowish.

Pemphigonotus is known from the East Indian Archipelago, from Sumatra to the Philippine Islands and New Guinea, and from northern Australia.

The *Neoloxotaenia* genus group

The four genera *Pseudothaumatomyia*, *Neoloxotaenia*, *Ensiferella* and *Globiops* have been united in this genus group on account of the similarities in their male genitalia which have discrete postgonites and pregonites, long cylindrical curved distiphallus, similar surstyli and especially because they all have, in contrast with all other chloropid genera I have seen, discrete, band-shaped sclerites lateral to the anus.

Pseudothaumatomyia, of which I have seen only females, is somewhat apart from the others. In general features it resembles *Ceraïs*. It differs from the other genera in having distinct, large tibial organs and brownish wings with thick veins of a more general chloropinae pattern. I have found no hairs on mpl and all hairs and bristles are short. The other three genera have wings of the *Neoloxotaenia*-type, that is thin, more or less iridescent membrane, slender, dark veins, long narrow discal cell and t_a in a distinctly proximal position, i.e. basal to tip of r₁ and in posterior half of the discal cell (also *Thressa* and a few other genera have wings of this type), and a few hairs on mpl.

Globiops has distinct bristles and distinct tibial organ and like *Pseudothaumatomyia* if are along the margin of the frontal triangle. The antennae are closer to the ground plan condition although the arista can be unusually long. The face is of the general type.

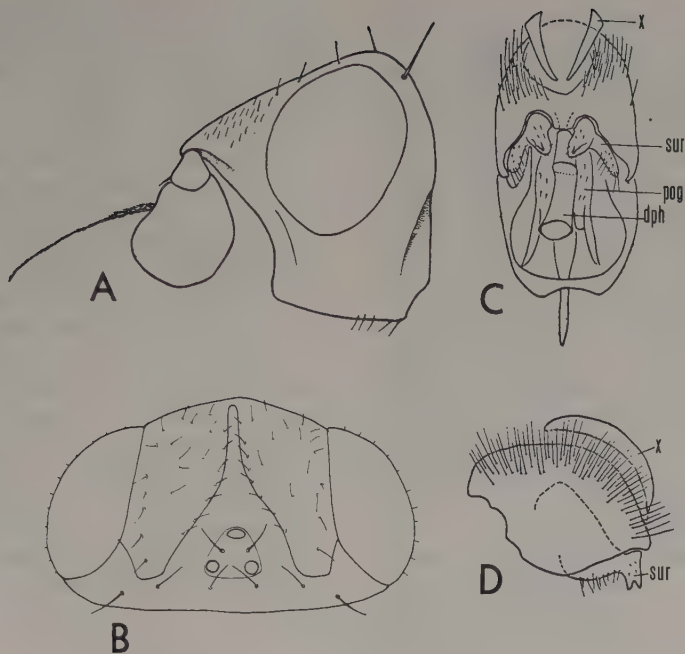


Fig. 99. — A—D. *Pseudothaumatomyia macrocera* Nartshuk. — A. Head, lateral view. — B. Head, dorsal view. — C. Male genitalia, ventral view. — D. Epandrium, lateral view. — x = secondary sclerite.

Neoloxotaenia and *Ensiferella* both have squarish frontal triangle with *if* on the surface, a sclerotized, shining face, very minute bristles and a very small tibial organ, or it is absent. The antennae are very different and specialized. Other differences between the two genera are present in the scutellum and the relative length of the gonites.

Neoloxotaenia and *Centorisoma* are rather similar in certain characters, antennae, wings and face, but the male genitalia are different. Some *Centorisoma* species have a long and slender ant_3 , as in *Neoloxotaenia*, but their ant_1 is shorter and the arista is thicker and more pubescent. In *Centorisoma* there is also a more or less sclerotized plate present on the face.

The species of *Ensiferella* could be placed, on the basis of the shape of the antennae, in *Mepachymerus* or *Steleocerellus*. But the male genitalia, wings, frontal triangle and *if* are very different. There are also differences in the arista. In *Ensiferella* both the basal segments are visible, and the second is relatively long. In *Mepachymerus* and *Steleocerellus* only the second is visible and this is very short.

Genus ***Pseudothaumatomyia*** Nartshuk, 1963: 672

Figs 99, 119 A.

Type species: *Pseudothaumatomyia macrocera* Nartshuk, 1963.

Medium size, 3—4 mm, stout, dark brownish species with somewhat enlarged ant_3 and distinctly recurved r_{4+5} .

Head higher than long, paler or darker brown, with very short dark bristles. Eyes long oval, with vertical long axes and sparse short hairs. Jowls broad, dusted, about as broad as ant_3 , with some dark and pale hairs below. *vi* short, dark. Cheeks distinct. Frons somewhat projecting, long as broad, yellowish, with thick to almost felt-like dust and short *fr*. Frontal triangle somewhat broader than half width of frons with concave side margins as a narrow stripe reaching almost to front of frons, black, smooth, shining. *if* in one row along the margin of the triangle, incurved. *oc* shorter than ocellar tubercle, procurved, divergent. *pvt* somewhat longer than *oc*, upright, convergent. *vii* smaller than *oc*, incurved, *vte* long as

pvt, situated down on the back of the head, upright or outcurved. About 5 indistinct, recurved *orb*, the posterior one stouter, more bristle-like. Occiput brownish. Face retreating with a low, narrow but distinct carina. Clypeus large, black, dusted. Proboscis short. Palpi slender, cylindrical. Antennae black. *ant*₂ normal. *ant*₃ large, squarish, somewhat longer than broad. Arista black, pubescent. Basal segments rather long. Flagellum short, only about twice as long as basal segments.

Thorax brownish with brown or black spots, bristles short. Humerus with spot and indistinct *h*. Mesonotum rather convex, smooth with shallow depressions along *dc* lines, heavily dusted with round, shining spots around the base of the numerous, evenly dispersed, short, dark, hairs. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 indistinct *p pa*, 1 *dc*. Scutellum rounded, convex, brownish, darker at sides, dusted, with numerous hairs. *ap sc* short, about half length of scutellum. 1 *la sc*. Pleura smooth partly dusted. *mpl* without hairs, dusted in upper posterior part. *stpl* shining, with black spot and few pale hairs.

Legs simple, brownish. Tibial organ large.

Wings large, of Chloropinae-type, somewhat brownish with coarse, dark veins, especially *r*₁ broadened. *r*₂₊₃ long, almost straight. *r*₄₊₅ ending at tip of wing, recurved. Halteres yellow.

Abdomen oval, brownish, dusted with short dark hairs. Female cerci short. Male genitalia, according to Nartshuk's figures, of the *Neoloxotaenia*-type with band-shaped secondary sclerites lateral to anus, rather long distiphallus and long postgonites.

Distribution: Amur Region (SE Siberia).

Material studied: *Pseudothaumatomyia macrocera* Nartshuk, ♀.

Genus *Globiops* n. gen.

Figs 100, 119 B.

Type species: *Globiops brunnescens* n. sp.

Small species, 1.5–2.0 mm in length, with epandrium with large, band-shaped secondary sclerites as in *Neoloxotaenia*.

Head large with rounded, large, almost naked eyes. Frontal triangle smooth, shining, with *if* along margins. Antennae with short, rounded squarish *ant*₃ and slender pubescent arista.

Thorax. Mesonotum rather convex, dusted, with dark hairs and bristles, yellow to brownish

with dark stripes. *mpl* with dark spots, and a few hairs.

Legs simple with narrow tibial organ.

Wings thin, iridescent, of *Neoloxotaenia*-type.

Abdomen. Male genitalia of *Neoloxotaenia*-type. Middle lobe of surstylus granulate. Postgonites long in comparison with pregonites, without strong bristles. Distiphallus long.

Distribution: Oriental Region.

Material studied: *Globiops brunnescens* n. sp.

Remarks. For further morphological details see the description of the type species below. Available material of other species from Sri Lanka indicates that numerous species from the Oriental Region, now usually referred to *Lasiosina*, *Thaumatomyia* (*Chloropisca*), *Chlorops* or other genera, ought to be transferred to *Globiops*. Some of these species differ in having mesonotum more heavily dusted, shorter and broader frontal triangle or shorter and dark arista.

Globiops brunnescens n. sp.

Figs 100, 119 B.

Type locality: Sri Lanka, Province of Sabaragamuwa, Ravine 5 miles NNW Balangoda.

Holotype: Male: Ceylon, Sabaragamuwa Prov., Stream at 2500 ft, 5 mls NNW Balangoda, 22.II.62. Loc. 96. Ravine. Swept above surface of small stream. Leg. Lund University Ceylon Expedition 1962. Brinck—Andersson—Cederholm.

Holotype in the Entomological Museum, Zoological Institute, Lund, Sweden.

Head very large, broader than long (ratio 35 : 20) and broader than thorax (ratio 35 : 28), about as high as long. Eyes very large, in side view broader above and narrower below, with sparse short hairs. Jowls linear with one row of pale peristomal hairs and 1 pale *vi*. Cheeks not visible in side view. Frons yellow, with dark hairs and bristles, somewhat projecting, distinctly longer than broad, dusted. *fr* very few, short. Frontal triangle narrow with convex side margins reaching front of frons, smooth, shining, yellow, brownish at sides. *if* in one row along the margin of the triangle. Ocellar tubercle situated close to vertex. *oc* rather short, procurved, divergent. *pvt* very short, about half the length of *oc*, procurved, parallel or divergent. *vti* distinctly longer than *oc*, somewhat procurved and outcurved. *vte* smaller than *vti*. About 6 very small *orb*. Face

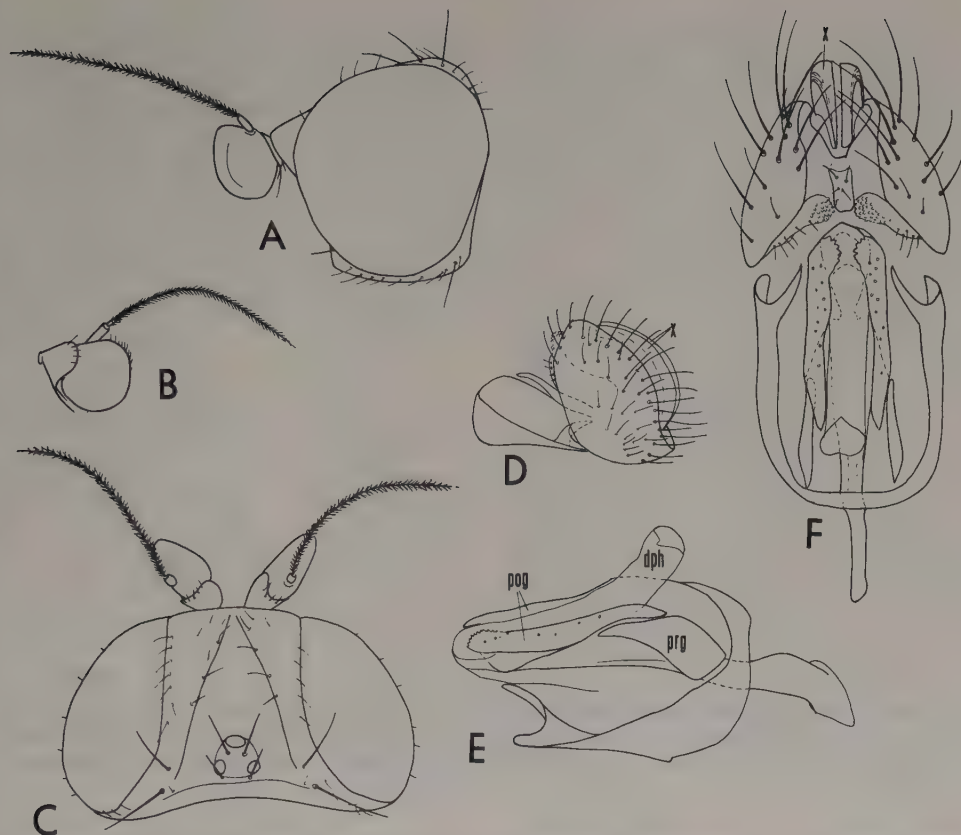


Fig. 100. — A—F. *Globiops brunnescens* n. sp. — A. Head, lateral view. — B. Antenna, inner side. — C. Head, dorsal view. — D. Male genitalia, lateral view. — E. Phallic complex, latero-ventral view. — F. Male genitalia, ventral view. — x=secondary sclerite.

concave with indistinct carina, yellow. Epistoma large and distinct. Clypeus formed by large lateral triangular sclerites, pale and shining, connected in front by a narrow bridge. Proboscis short. Palpi yellow, short, cylindrical. ant₂ yellow, short. ant₃ about as long as broad, rounded squarish, pubescent at apex and with a curved scar-like sensory organ on external surface, yellow, in apical half black. Basal segments of arista relatively short, flagellum very long, narrow, yellow with distinct pubescence.

Thorax. Humerus without distinct spot, 1 moderately long *h*. Mesonotum very convex with indications of shallow grooves along dorso-central lines, thinly dusted, subshining, evenly covered with very short dark hairs, brownish with five black, longitudinal stripes. Bristles moderately long. 1 *a npl*, 2 *p npl*, 1 somewhat shorter *a pa*, 1 *p pa*, 1 *dc*. Scutellum brownish yellow, rounded, convex, dusted, with few hairs on the disc and along sides. *ap sc* longer than scutellum, not approx-

imated. 1 distinct *la sc*. Between *ap sc* and *la sc* 1 stronger bristle-like hair. Pleura smooth, shining, brownish with black spots. *mpl* with very few hairs above. *stpl* with few hairs below.

Legs rather long and slender, simple, brownish. t₃ with distinct but narrow tibial organ. Fore tarsi with 3 apical segments black, middle and hind tarsi with only 2 apical segments black.

Wings rather long with thin iridescent membrane and distinct microchaetae. Discal cell very narrow. t_a basal to tip of r₁ and in basal half of discal cell. t_b very short. Halteres yellow.

Abdomen oval, brown, dusted with black hairs. Male epiproct with large, half-circular lateral secondary sclerites. Middle lobe of surstylus with granulated apex. Postgonites very long, serrated at distal end, without long bristles. Pregonites short. Penis long, cylindrical, downcurved.

Length: 2.5 mm. Wing length: 2.1 mm.

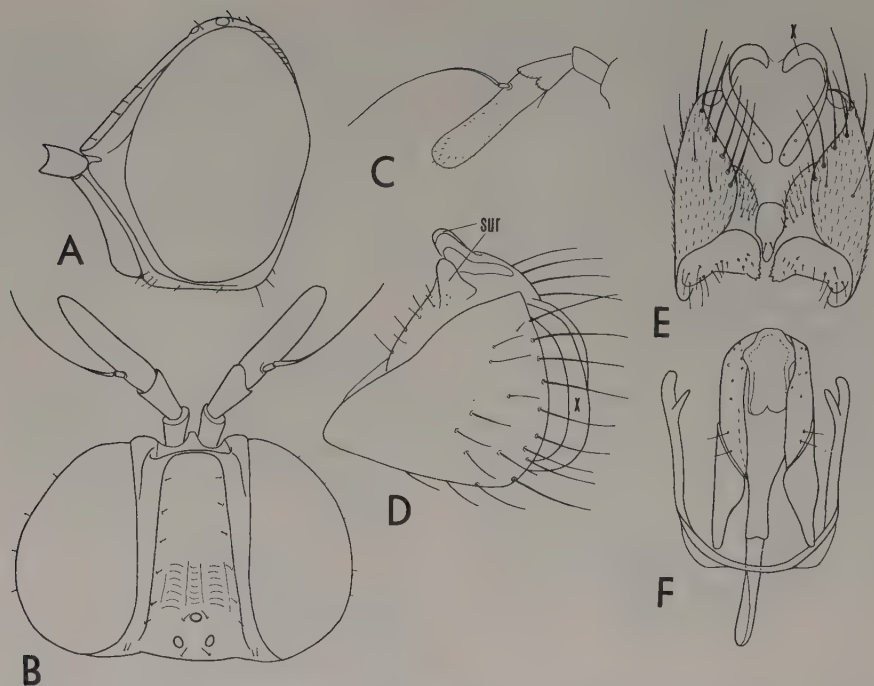


Fig. 101. — A—F. *Neoloxotaenia gracile* (de Meijere). — A. Head, lateral view, ant₂ and ant₃ omitted. — B. Head, dorsal view. — C. Antenna, outer side. — D. Epandrium, latero-ventral view. — E. Epandrium, ventral view. — F. Phallic complex, ventral view. — x = secondary sclerite.

Genus *Neoloxotaenia* Sabrosky, 1964: 180

Figs 101, 119 C.

Type species: Lagaroceras gracile de Meijere, 1908.

Synonymy: Loxotaenia Becker, 1911: 83, type species: *Lagaroceras gracile* de Meijere, 1908 (pre-occupied, Sabrosky 1964).

Small, 2—3 mm, black species with yellow markings, large head and prolonged antennae.

Head higher than long, black, partly brownish, with most bristles almost invisible or absent. Eyes very large, occupying almost the whole lateral parts of the head, long oval with vertical long axes. Jowls linear with few hairs and 1 posterior *pst*. Vibrissal angle $>90^\circ$. *vi* absent. Cheeks linear. Frons and face sloping towards middle of head where the antennae are inserted. Frons much narrower than long, not shining, without *fr*. Frontal triangle large, rectangular with straight side margins, broadly reaching front of frons, black, smooth, shining. *if* small, in one row on the disc of the triangle. *oc* and vertical bristle extremely small, hair-like, of uncertain arrangement. *orb* absent. Face retreating, convex, without carina, but covered with large, shining sclerite. Clypeus

well-developed, shining, black. Proboscis short. Palpi rather stout, black. Antennae brown, prolonged. ant₁ clearly visible, ant₂ nearly twice as long as broad. ant₃ four times as long as broad, rectangular, shortly pubescent. Arista dark, slender, naked.

Thorax higher than broad, black, almost completely dusted with brown and grey dust and without distinct bristles, except *ap sc*. Humeri dark. Mesonotum strongly convex with narrow depressions along *dc* lines, smooth, with thick brown dust and sparse, evenly dispersed very short, dark hairs. Scutellum rounded, convex, dusted, with some hairs. *ap sc* rather short, 1—2 hair-like *la sc*. Pleura smooth. Subspiracular callus shining. *stpl* in anterior part with a shining spot. Pleura otherwise brown, along a broad stripe from side of mesonotum, over *npl*, *mpl*, and *stpl* with bluish-grey, thick dust. *mpl* with few hairs. *stpl* with some hairs.

Legs slender, simple, femora brown, tibia and tarsi yellow. Tibial organ absent.

Wings very thin and iridescent, *Thressa*-like. *t_a* distinctly proximal of tip of *r₁*, at middle of

discal cell. Discal cell very narrow. Halteres with dark shaft and white knob.

Abdomen oval, dark, dusted, with dark hairs. Epiproct in male laterally with long sclerotized band-like sclerites. Middle lobe of surstylus serrated at apex. Postgonites long with two anterior bristles, connected with hypandrium by pregonites. Distiphallus relatively short (in fig. 101 F only the basiphallus is figured).

Distribution: Indonesia, Formosa.

Material studied: *Neoloxotaenia gracile* (de Meijere).

Genus *Ensiferella* n. gen.

Figs 102, 119 D.

Type species: *Ensiferella ceylonica* n. sp.

Small, 2–3 mm in length, yellow and black species, with kidney-shaped ant₃ and long, broad, terminal arista.

Head short and broad with large, almost naked eyes, broad frons with a large, squarish frontal triangle with *if* on the surface. ant₃ oblique, kidney-shaped. Arista terminal, very long and broad with short pubescence, black. First basal segment short but visible, second segment rather short, about as long as width of flagellum. Head bristles very short.

Thorax short and broad, rather flat. Scutellum prolonged, flat. Pleura shining, spotted. mpl with few hairs.

Legs short, rather stout, especially f₃. Tibial organ absent.

Wings of *Neoloxotaenia*-type with long and narrow discal cell and t_a inside middle of discal cell and inside tip of r₁.

Abdomen oval. Epandrium with band-like secondary sclerites at sides of anus. Postgonites short. Pregonites long and slender. Distiphallus long, cylindrical, downcurved.

Distribution: Oriental region. I think that a number of Oriental species, described in *Steleocerus* and by Frey (1961) transferred to *Mepachymerus* subgenus *Steleocerellus*, such as *S. pallidior* Becker, 1924, *S. formosus* Becker, 1911, and *S. iridifrons* Frey, 1923, will prove to belong to *Ensiferella* n. gen.

Ensiferella ceylonica n. sp.

Figs 102, 119 D.

Type locality: Sri Lanka, Western Province, River Ja Ela, 10 miles NNE of Colombo.

Holotype: Male: Sri Lanka (Ceylon), Western province, River Ja Ela, 11.I.1962. Leg. Lund

University Ceylon Expedition, 1962. Brinck—Andersson—Cederholm.

Holotype in The Entomologica Museum, Zoological Institute, University, Lund, Sweden.

The new species is characterized by a large squarish frontal triangle with distinct yellow-green-blue-red metallic lustre covering most of the frons, yellow thorax with four black spots on the pleura and mesonotum with yellow side margins and a large rectangular yellow spot in front of the large, prolonged, flat, yellow scutellum. *Steleocerus pallidior* Becker, 1924, with largely yellow thorax and yellow scutellum lacks the large yellow spot on posterior part of mesonotum and has only one (on stpl) black spot on pleura. *Steleocerus formosus* Becker, 1911, has steel-blue frontal triangle and flat, yellow scutellum but pleura, except a yellow streak on stpl, completely black. *Steleocerus iridifrons* Frey, 1923, has black frontal triangle with multicolored lustre like *ceylonica* n. sp. but completely black mesonotum and scutellum.

Description. Male. *Head* higher than long, yellow, partly black on posterior side. Eyes very large, covering most of the lateral surface of the head, rounded but broader above with vertical long axes, with very few short hairs. Jowls very narrow, narrower than arista, with few pale hairs. *vi* short, pale. Cheeks narrow, invisible in side view, with a black streak. Frons very little projecting, long as in front broad, behind somewhat narrower, dusted, with single *fr*. Frontal triangle large, covering most of frons, with parallel, straight side margins reaching front of frons, smooth, shining, except at sides of ocellar callus, yellowish with black to brownish dumb-bell shaped spot, shining, with yellow-green-blue-red metallic lustre. Frontal triangle along the hind margin and the posterior quarter of the side margins with a groove. *fr* small, in two irregular rows on the surface of the triangle. *oc* small, shorter than the distance between the ocelli, procurved, divergent. *pvt* still smaller, upright, somewhat convergent. *vte* indistinct. *vte* short but distinct, bristle-like, long as ocellar tubercle, outcurved and recurved. About 8 indistinct, recurved *orb*. Head broad, ratio width: length = 45:20. Face flat, concave in side view, covered with a distinct, shining sclerite. Carina absent. Clypeus large, brownish, shining. Proboscis very short. Palpi short, somewhat clavate, black, with thick pubescence. Antennae yellow. ant₃ brownish on upper surface. ant₁ short but visible. ant₂ narrow, about twice as long as

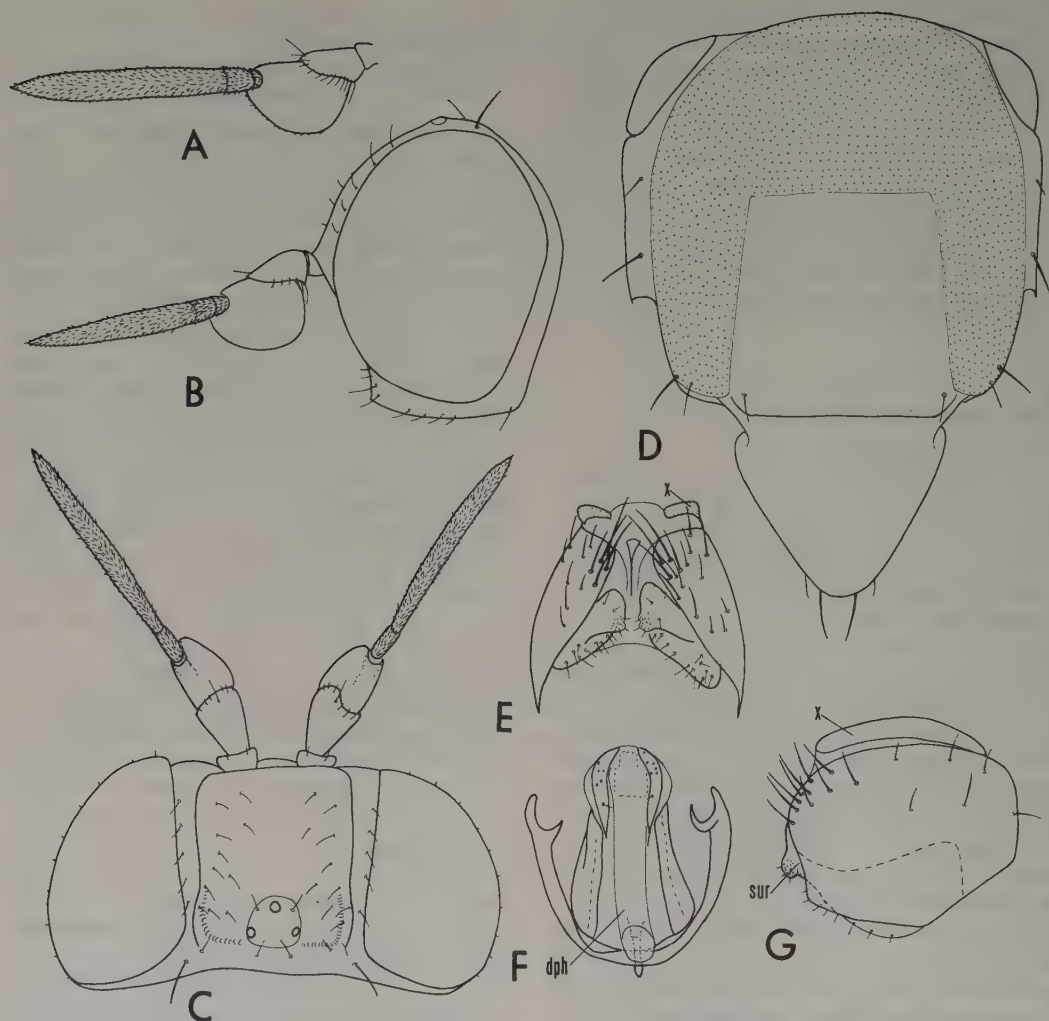


Fig. 102. — A—G. *Ensiferella ceylonica* n. sp. — A. Antenna, outer side. — B. Head, lateral view. — C. Head, dorsal view. — D. Thorax, dorsal view. — E. Epandrium, ventral view. — F. Phallic complex, ventral view. — G. Epandrium, lateral view. — x=secondary sclerite.

broad. ant₃ obliquely kidney-shaped, broader than long. Arista placed near apex of ant₃, longer than length of head, ratio 25:20, very broad, sword-like, black, pubescent. First basal segment of arista linear, second segment long as broad, pubescent.

Thorax yellow with black markings, shining with very short hairs and bristles. Humerus yellow without spot and without distinct *h*. Mesonotum moderately convex, somewhat flattened behind, black, at sides and on a large rectangular area anterior to scutellum yellow, with coarse, granulated microsculpture and evenly covered with numerous very short, pale

hairs. 1 small hair-like, pale *a npl*, 1 distinct, dark *p npl*, 1 short, dark *a pa*, 1 shorter, dark *p pa*, 1 very small, hair-like but dark *dc*. Scutellum triangular, flattened, shining, yellow, with short pale hairs. *ap sc* short, rather close together. Pleura shining, smooth. *mpl* with a large oval, black spot below and some short pale hairs. *stpl* with large, black spot and few pale hairs. *ptpl* with a brownish spot in the anterior, lower corner. *hpl* with dusted, black spot. *mn* black, shining.

Legs short, rather stout, yellow. *f*₃ somewhat thickened and concave below. *t*₃ almost straight, without tibial organ.

Wings short, narrow, of *Neoloxotaenia*-type with narrow discal cell and t_a in posterior half of discal cell and distinctly inside tip of r_1 .

Abdomen oval, with short, dark and pale hairs. Segments 1+2 and 3 very long, segment 4 short, linear, segment 5 normal. Tergites 1—4 dorsally brownish, along lateral margins yellow. Tergites 1—3 broadly dusted in the middle, shining at sides. Tergite 1—2 in the middle with a large triangular yellow area. The inflapped parts of tergites yellow with narrow black inner margins.

Epandrium chestnut-brown, with band-shaped secondary sclerites at sides of anus. Postgonites short. Pregonites long and slender. Distiphallus long and downcurved.

Length: 2.7 mm. Wing length: 2.2 mm.

The *Centorisoma* genus group

The genus *Centorisoma* Becker was described as being related to *Cetema*. Later Becker (1912) synonymized *Centorisoma* with *Lagaroceras*. Nartshuk (1965) monographed the genus *Centorisoma* and described several new species. They are all characterized by the male genitalia with large subanal lobe, long, hooked middle lobe of surstylus and fused postgonites and pregonites. The colour varies, the mesonotum being brownish with red or black stripes or completely black but always with a granulate microsculpture. ant_3 is more or less prolonged and the arista pale with thick pubescence.

Lagaroceras undoubtedly is similar in many respects, especially the antennae and the frontal triangle are similar; the male genitalia on the other hand are significantly different.

Because I cannot demonstrate a closer relationship between *Centorisoma* and any other genus, I will place it in a genus group of its own.

Genus *Centorisoma* Becker, 1910: 106

Figs 103, 118 J.

Type species: Centorisoma elegantulum Becker, 1910.

Species small, 2.0—2.5 mm, black with yellow markings and red-yellow legs, rather slender with large head.

Head higher than long, brownish yellow with brown to black markings. Bristles shorter or

longer. Eyes rather large, oval or kidney-shaped with oblique long axes, naked or with very sparse short hairs. Jowls moderately broad, about as broad as breadth of ant_3 , shining, with one row of pale peristomal hairs. vi indistinct. Cheeks not visible from side. Frons somewhat projecting, longer than broad, shining, with very few *fr*. Frontal triangle large to very large, behind broad as frons, with straight or somewhat convex side margins, rounded off at apex, shining, smooth, brownish black. *if* short, procurved and incurved in one row on the margin of the triangle. *oc* very short, hair-like, procurved and divergent. *pvt* very small, procurved, convergent. *vti* and *vte* small, but distinctly longer than *oc*. *orb* 5—8, small, recurved. Occiput black. Face flat, without carina but below with a central dark, shining, heavily sclerotized area. Clypeus shining black. Proboscis short. Palpi slender, dark, with black hairs. Antennae brownish, partly more darkened. ant_2 somewhat prolonged, ant_3 longer than broad (ratio 2—3:1). Arista with basal segments yellow, flagellum white, pubescent.

Thorax narrower than head, black or yellowish brown with dark, black or red, spots and stripes. Humeri black, shining, without distinct *h*. Mesonotum with coarse granulate microsculpture, shining or dusted in posterior third, evenly covered with numerous short, dark hairs. Bristles short. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 small *p pa*, 1 *dc*. Scutellum rounded, convex, dark, dusted, rather smooth, with numerous hairs on the disc. *ap sc* about half length of scutellum. 1 small *la sc*. Pleura smooth, dark, shining. *stpl* with few pale hairs.

Legs moderately long, slender. t_2 with distinct straight, black ventral spur. Tibial organ present as a very narrow stripe.

Wings of *Chloropinae*-type. Halteres yellow.

Abdomen rather long and narrow, dark, dusted, with black hairs. Epandrium large, not flapped in at sides. Subanal lobe well developed. Intra-epandrial sclerite well developed. Mesolobus large. Surstyli with distinct upper lobe and long hook-like middle lobe. Postgonites slender, fused with pregonites which apically are at sides and below postgonites. Basiphalllic structures long and narrow. Distiphallus very long, apically club-shaped.

Distribution: Palaearctic Region.

Material studied: *Centorisoma elegantulum* Becker; *C. flavum* Nartshuk, 1965; *C. obscuripenne* Nartshuk, 1965; *C. arsenjevi* Nartshuk, 1965; *C. kozlovi* Nartshuk, 1965; *C. mongolicum* Nartshuk, 1968.

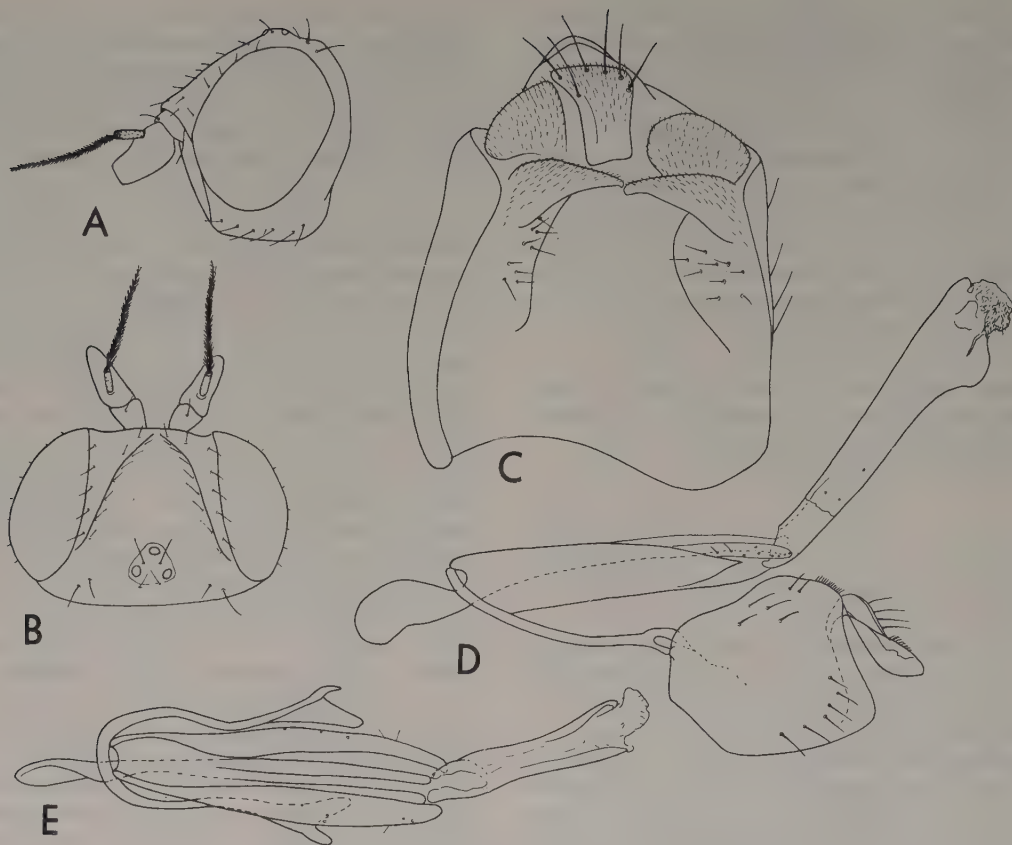


Fig. 103. — A—E. *Centorisoma elegantulum* Becker. — A. Head, lateral view. — B. Head, dorsal view. — C. Epandrium, oblique ventral view. — D. Male genitalia, lateral view. — E. Phallic complex, ventral view.

The *Assuania* genus group

The *Assuania* genus group is characterized primarily by the male genitalia. The surstyli are more or less completely fused with the epandrium. In *Assuania* Becker, *Lagaroceras* Becker and *Desertochlorops* Nartshuk the epandrium is of the same type with shortly projecting middle lobe of surstylus. In some *Assuania* species this lobe is more projecting, almost as in *Lasiosina cinctipes* Meig. Most *Assuania* species have a rather *Chlorops* or *Thaumatomyia*-like general shape with wings of *Chlorops*-type and a rather short and convex mesonotum, striped in yellow and black. Other species have a yellow area above *anpl* and thus resembles *Lagaroceras*. The antennae can be at least as long and slender as in *Lagaroceras*, with ant_2 twice as long as broad and ant_3 three times as long as broad. The arista is dark with short pubescence.

Lagaroceras differs from *Assuania* mainly in the shape of the antennae, the arista being somewhat thickened, white, with distinct pubescence. The postgonites are apically more strongly curved than in *Assuania* and more like those of *Lasiosina*.

The genitalia of *Desertochlorops* are very similar to those of *Lagaroceras* and *Assuania* but the wings are different with short procurved r_{2+3} and r_{4+5} and cross-veins approximated, thus resembling *Pseudopachychaeta*.

Lasiosina Becker and *Stenophthalmus* Becker form a group with "Lasiosina-like" general features, that is a pale yellowish ground-colour, with black stripes and greyish dust, rather flat mesonotum and scutellum and epandrium usually with very large and long surstyli closely united with the epandrium. Differences are present in the antennae, eyes, frontal triangle etc. The abdomen of *Stenophthalmus* is longitudinally striped in black and yellow. *Meto-*

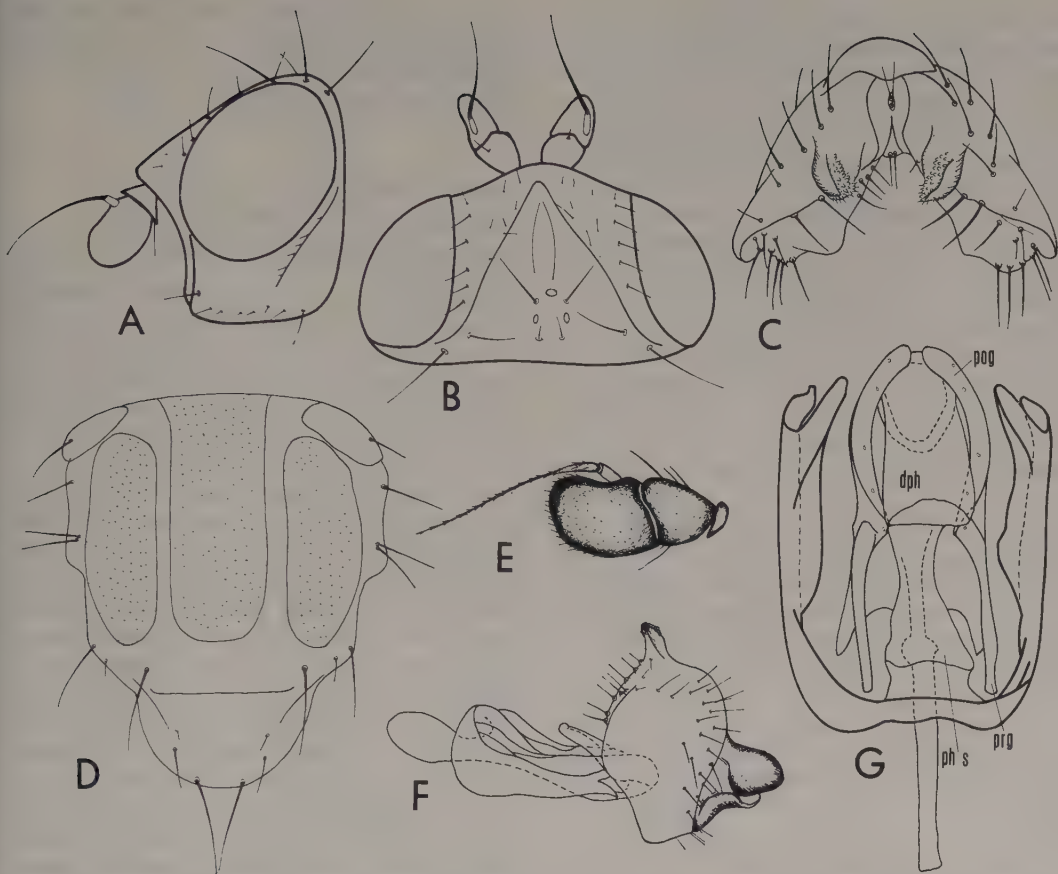


Fig. 104. — A—G. *Assuania thalhammeri* Strobl. — A. Head, lateral view. — B. Head, dorsal view. — C. Epandrium, posterior view. — D. Thorax, dorsal view. — E. Antenna, inner side. — F. Male genitalia, lateral view. — G. Phallic complex, ventral view.

postigma Becker is very similar to these two genera in the general shape of the thorax and has a striped abdomen like *Stenophthalmus*. Therefore, I place it close to *Stenophthalmus* in spite of the fact I have not studied the male genitalia and there are differences in head structure.

Most of the species now referred to *Pseudopachychaeta* Strobl (*P. approximatonervis* (Zett.) and its allies) have usually been placed in *Lasiosina*. They undoubtedly belong to the same genus group as *Lasiosina* but the differences are too important to allow their inclusion in the genus. In *Pseudopachychaeta* the surstylus is largely covered by granulae and not so closely fused with the epandrium and there is usually a distinct membraneous area between them. Furthermore there are substantial differences in the gonites and wings.

Genus *Assuania* Becker, 1903: 149

Figs 104, 119 E.

Type species: *Eutropha thalhammeri* Strobl, 1893 (as *Assuania glabra* Becker, 1903) (Sabrosky 1941).

Small species, 2.0–2.5 mm, in general shape like a small *Chlorops* with brownish yellow ground-colour and darker brown to black spots.

Head higher than long, brownish yellow with brown markings. Head bristles well developed, black, except on jowls. Eyes of medium size, oval with almost vertical long axes, naked. Jowls broad, almost as broad as half height of eye, shining, with pale peristomal hairs. *vi* very indistinct, pale. Cheeks well developed. Frons somewhat projecting, as long as broad, brownish yellow, shining with few *fr*. Frontal triangle large, broad behind, with slightly convex side

margins, almost reaching front of frons, shining, smooth, brownish, with a central longitudinal shallow depression. *if* few, short, procurved, along the margin of the triangle. *oc* strong, longer than ocellar callus, procurved, divergent. *pvt* small, about half the length of *oc*, procurved, convergent. *vti* and *vte* distinct somewhat stronger than *oc*. *orb* about 4, long as *pvt*, recurved. Occiput brownish black. Face narrow, somewhat concave, sometimes with a shining sclerite. Clypeus black, shining. Proboscis short. Palpi cylindrical, slender, with white hairs. Antennae brownish yellow. *ant*₂ somewhat prolonged. *ant*₃ longer than broad (ratios from 4:3 to 3:1). Arista with brown basal segments. Flagellum brown, black towards tip, bare or with extremely short pubescence.

Thorax rather short almost as broad as head. Predominantly smooth, shining, with black hairs and bristles. Humeri brown with darker spot and 1 small *h*, about half as long as *a npl*. Mesonotum rather strongly convex as in most *Chlorops*, smooth, shining or dusted with sparse short hairs spread over the dorsal area, ground-colour yellowish brown with three broad brownish black stripes or unicoloured black. Anterodorsal of the notopleurals a rounded yellow area. 1 strong *a npl*, 2 strong *p npl*, 1 strong *a pa*, 1 very short, hair-like *p pa*, 1 strong *dc*. Scutellum rounded, convex yellow, dusted, with a couple of short hairs on the disc, *ap sc* strong, as long as length of scutellum, 1 weaker *la sc* about half the length of *ap sc*. *npl* partly dusted like posterior part of *ptpl* and *hpl*. Pleura otherwise shining, brownish yellow with darker brown to black spots. *mpl* without hairs. *stpl* with indistinct dark spot and a few pale hairs.

Legs short, simple, extensively brownish. Tibial organ absent.

Wings of Chlorops-type. Halteres with white knob.

Abdomen ovoid brown, dusted with dark hairs. Male genitalia of distinct type. Supra-anal and subanal plates sclerotized, projecting. Epandrium fused apically of the very small mesolobus. Middle and upper lobes of surstyli fused with epandrium, lower lobe partly free. Apex of middle lobe pointed with apical edge, granulated. Intra-epandrial sclerite well developed. Postgonites narrow, curved. Pregonites narrow situated proximally of postgonites. Distiphallus short. *T*₆₊₇ distinct, symmetrical. Sternites distinct, long and narrow.

Distribution: Recorded from Europe, Africa,

E Asia and Australia. I have seen material from Europe and Africa.

Material studied: *Assuania thalhammeri* (Strobl); *A. glabricollis* Becker, 1910.

Genus **Lagaroceras** Becker, 1903: 149

Figs 105, 119 F.

Type species: *Lagaroceras megalops* Becker, 1903.

Small species, 2.0–3.0 mm, with prolonged *ant*₂ and *ant*₃ and white pubescent arista.

Head higher than long, yellow with black markings. Eyes large, rounded, higher than long with vertical long axes, naked or with very few short hairs. Jowls narrower than width of *ant*₃, with one row of pale hairs, 1 pale *vi*. Cheeks invisible in side view. Frons distinctly projecting, longer than broad, with dark bristles, dusted, with few *fr*. Frontal triangle large but moderately broad, behind with convex, towards tip concave, side margins reaching front of frons, smooth, shining, black, with a dusted area around the ocellar tubercle. *if* procurved, in one row distinctly outside the margin of triangle. *oc* rather long, procurved, divergent. *pvt* small, large as *if*, procurved, slightly convergent. *vti* and *vte* long as *oc*. *vti* procurved and incurved. *vte* outcurved. *orb* about 7, recurved, short, the posterior 2 somewhat longer. Face sloping, without carina. Clypeus partly dusted, pale, with lateral parts blackish. Proboscis extremely short. Palpi cylindrical, slender, very short. *ant*₂ prolonged, longer than high. *ant*₃ long and narrow, at least twice as long as high, yellowish, darkened towards tip. Arista basally thick, yellow, flagellum white with thick pubescence.

Thorax yellow with brown to black markings. Humerus yellow with dark spot, without distinct *h*. Mesonotum moderately convex, unicoloured black or with a rounded yellow spot above *a npl*, dusted, with slight, narrow impression along *dc* lines, slight microsculpture and evenly covered with very short, dark hairs. Thoracic bristles dark, moderately strong. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*. Scutellum rounded, dusted, with few hairs on the disc, yellow or dark above. *ap sc* longer than scutellum. 1 short *la sc*. Pleura smooth, *mpl* shining, without hairs. *stpl* shining with a few hairs.

Legs pale, moderately long, simple, without tibial organ.

Wings of Chlorops-type. Halteres yellow or white.

Abdomen long oval, dark, dusted with black

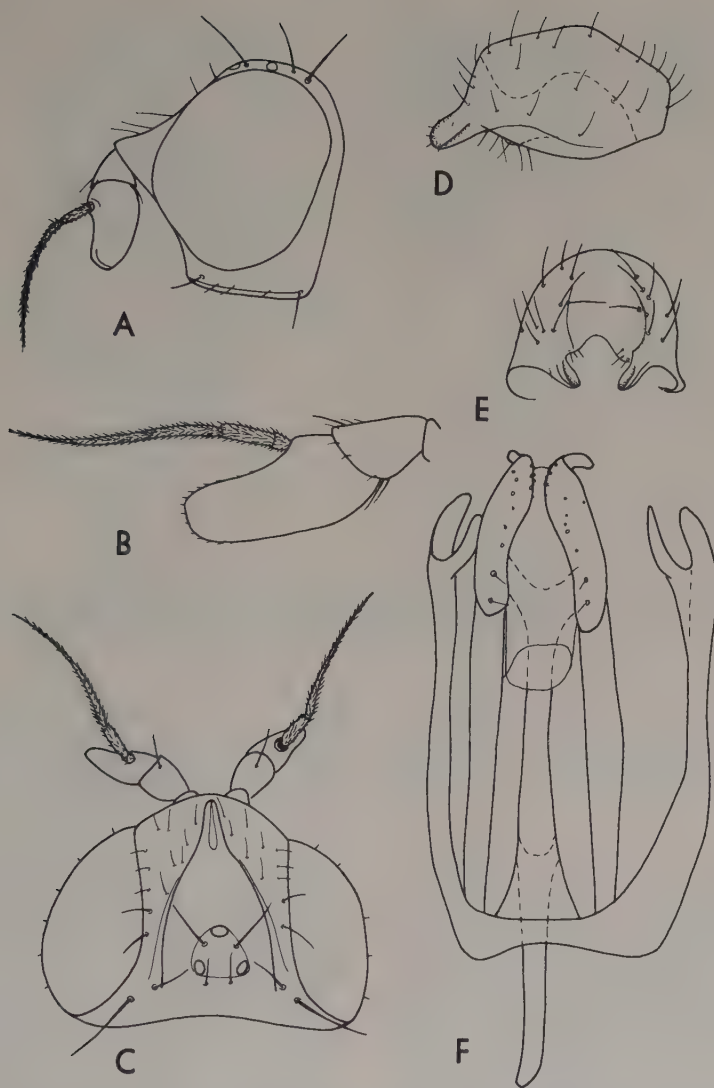


Fig. 105. A—F. *Lagaroceras megalops* Becker. — A. Head, lateral view. — B. Antenna, inner side. — C. Head, dorsal view. — D. Epandrium, lateral view. — E. Epandrium, posterior view. — F. Phallic complex, ventral view.

hairs. Male genitalia very similar to those of *Assuania* but postgonites with a distinct dorsal hook as in *Lasiosina*.

Distribution: Africa.

Material studied: *Lagaroceras megalops* Becker.

Genus **Desertochlorops** Nartshuk, 1966: 264

Fig. 106.

Type species: *Desertochlorops stackelbergi* Nartshuk, 1966.

The original description of this genus shows that the male genitalia are very close to those of *Assuania* and *Lagaroceras* with the surstyli completely fused with the epandrium. The free ends of the middle lobes of the surstyli are short and of the same shape as in most species of these genera. *Desertochlorops* differs from them in some characters, ant_3 is short, the wings of *Pseudopachychaeta*-type with r_{2+3} and especially r_{4+5} short and procurved, r_{4+5} and m_{1+2} strongly divergent and t_a — t_p very short. The frontal triangle is very narrow, with

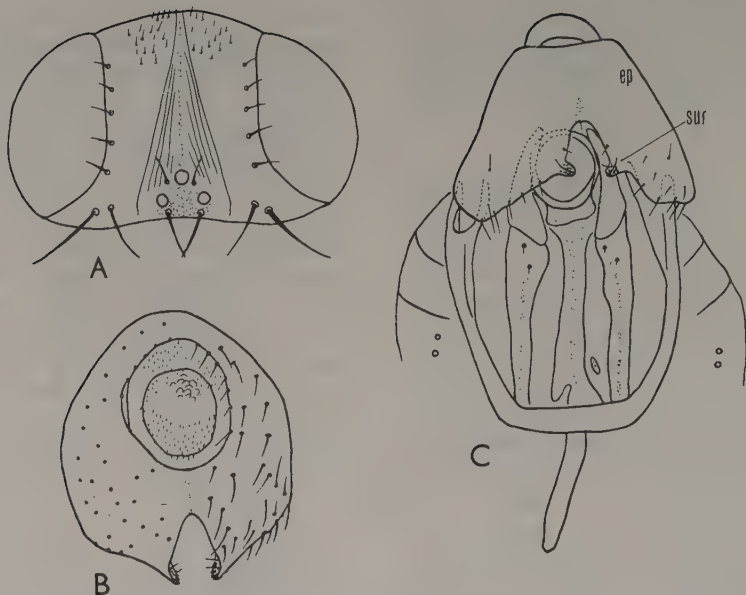


Fig. 106. — A—C. *Deserτοchlorops stackelbergi* Nartshuk. — A. Head, dorsal view. — B. Epan-drium, posterior view. — C. Male genitalia, ventral view. After Nartshuk, 1966.

straight side margins and fine longitudinal grooves. Tibial organ present.

Distribution: Central Asia.

Genus *Lasiosina* Becker, 1910: 73

Figs 107, 119 G.

Type species: *Chlorops cinctipes* Meigen, 1830.

Species of moderate size, 2—3 mm, at least some with distinct sexual dimorphism, males having yellow palpi and antennae, female black palpi and ant₃.

Head high as long, yellow with black spots and well developed bristles. Eyes oval with horizontal long axes, with sparse hairs. Jowls rather broad, somewhat broader than ant₃, with one row of pale hairs. 1 distinct pale *vi*. Cheeks invisible. Frons somewhat projecting, as broad as long, subshining, with some *fr*. Frontal triangle small, behind often not broader than 1/3 width of frons, with somewhat convex side margins reaching middle of frons, from there as a narrow line reaching front of frons, yellow but usually with black spot at tip and black ocellar tubercle, dusted but with shining areas especially at sides behind and on the black spot. *if* in one row distinctly outside margin of triangle, incurved. *oc* and vertical bristle strong, subequal. *pvt* somewhat smaller.

oc procurved and divergent. *pvt* upright and cruciate. *vte* outcurved. *vti* incurved. Occiput black. Face concave with shallow carina. Clypeus small, shining. Probosis short. Palpi cylindrical or somewhat thickened, black or yellow. Antennae black or yellow. ant₂ short with distinct bristle. ant₃ rounded, higher than long, shortly pubescent. Arista black with short pubescence.

Thorax yellow with black stripes and spots, and strong bristles. Humerus with dark spot and 1—3 *h*. Mesonotum rather flat, especially behind, with shallow depression along *dc* lines, smooth, dusted, evenly covered with short hairs. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 *p pa*, 1 *dc*. Scutellum rounded, flattened, yellowish or brown, usually darker at sides, dusted, with hairs on the disc. *ap sc* long as scutellum. 1—2 *la sc*. Pleura smooth, more or less dusted. *mpl* without hairs. *stpl* with black spot and pale hairs.

Legs rather stout, simple, yellow or partly darkened. Tibial organ absent.

Wings of *Chlorops*-type. *r*₂₊₃ recurved, except at tip. *r*₄₊₅ slightly procurved. *r*₄₊₅ and *m*₁₊₂ divergent. *t*_a—*t*_p distinctly longer than *t*_p. Halteres yellow or white.

Abdomen long oval, dark above, dusted, with dark or white hairs. Female cerci normal. Surstyli fused with epandrium, granulated at

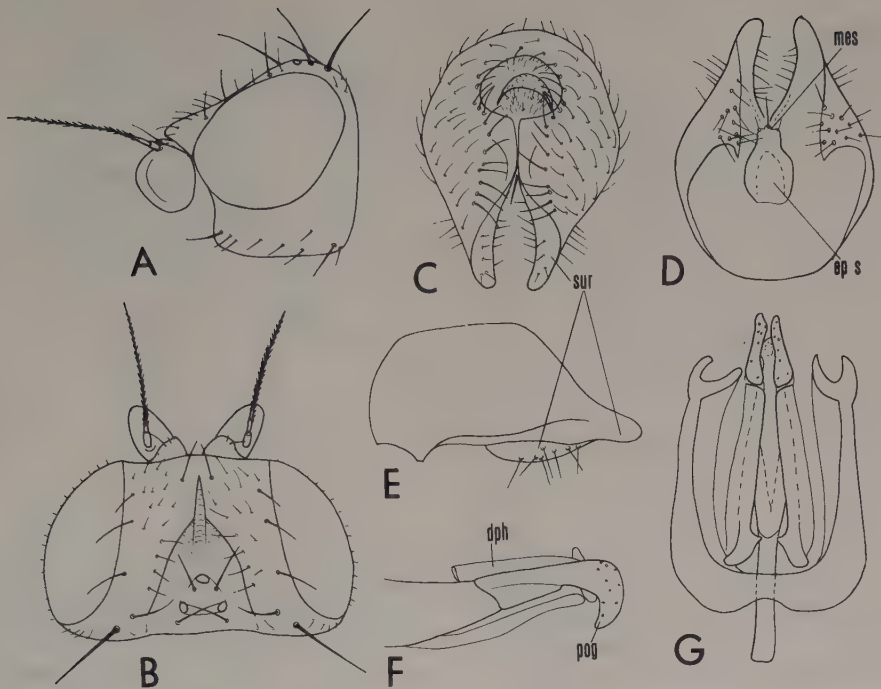


Fig. 107. — A—G. *Laiosina cinctipes* (Meigen). — A. Head, lateral view. — B. Head, dorsal view. — C. Epandrium, posterior view. — D. Epandrium, ventral view. — E. Epandrium, lateral view. — F. Distiphallus and postgonite, lateral view. — G. Phallic complex, ventral view.

apex, sometimes very long. Postgonites apically curved upwards.

Distribution not clear due to lumping with *Pseudopachychaeta* species. True *Laiosina* are present at least in the Palaearctic Region.

Material studied: *Laiosina cinctipes* (Meigen); *L. albipila* (Loew, 1866).

Genus *Stenophthalmus* Becker, 1903: 148

Figs 108, 119 H.

Type species: *Stenophthalmus ocellatus* Becker, 1903.

Small species, 2—3 mm, *Laiosina*-like, yellow with black markings, dusted, with long oval eyes and white arista.

Head longer than high, yellow with well-developed pale bristles. Eyes narrow, oval with horizontal long axes and sparse short hairs. Jowls broad, at least as broad as ant_3 , with pale hairs in lower half. vi short, pale. Cheeks not visible. Frons somewhat projecting, about as long as broad behind, narrower in front, dusted, with some *fr*. Frontal triangle narrow

with straight or somewhat concave side margins reaching $1/2$ to $2/3$ of frons and from there as linear stripe reaching front of frons, yellow or darker in the middle, smooth, dusted. *if* outside the margin of triangle, indistinct or absent. *oc* and vertical bristles subequal, *pvt* and *vte* somewhat shorter. *oc* procurved, divergent. *pvt* upright, cruciate. *vti* procurved, *vte* outcurved. 3 strong, recurved bristle-like *orb*. Face narrow, concave, with only traces of carina. Clypeus large, shining, black. Proboscis short, palpi short cylindrical. Antennae yellowish, partly darkened. ant_2 short. ant_3 somewhat longer than broad with somewhat pointed upper corner. Arista long, pale. Basal segments yellow with short pubescence. Flagellum white with short pubescence.

Thorax yellow with black markings, thick grey dust, and pale bristles. Humerus with dark spot and distinct *h*. Mesonotum rather flat, somewhat depressed behind, yellow with 3 black stripes, and sparse, very short, pale hairs. 1 *a npl*, 1—2 *p npl*, 1 long *a pa*, 1 short hair-like *p pa*, 1 long *dc*. Scutellum rounded, convex, dusted, with few hairs, yellow, dark at

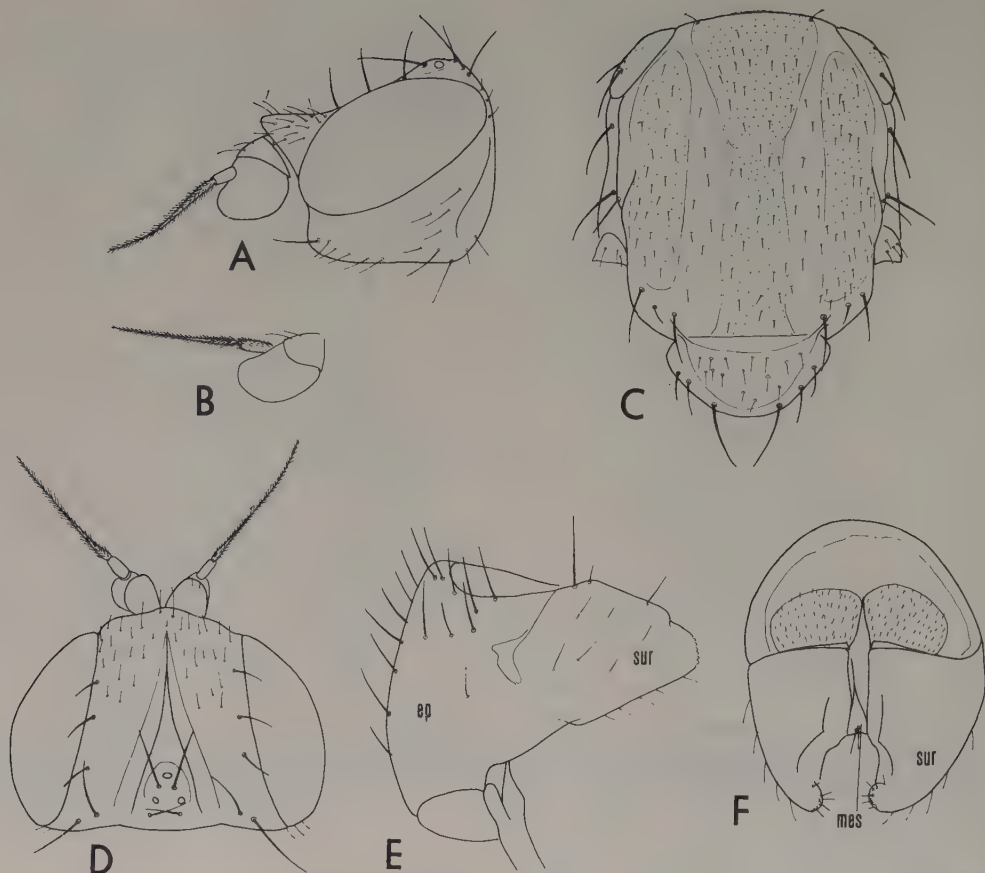


Fig. 108. — A—F. *Stenophthalmus typhae* Nartshuk. — A. Head, lateral view. — B. Antenna, inner side. — C. Thorax, dorsal view. — D. Head, dorsal view. — E. Epandrium, lateral view. — F. Epandrium, posterior view.

sides. *ap sc* long as scutellum, rather widely apart. 1—2 shorter *la sc*. Pleura smooth, dusted with black spots. *mpl* without hairs, *stpl* with few pale hairs.

Legs slender, dusted, with pale hairs, simple, yellow and more or less darkened, without tibial organ.

Wings of Chloropinae-type, with pale veins. Halteres yellow.

Abdomen long, oval, with longitudinal dark and yellow stripes: tergites dorsally in the middle dark, at sides yellow, laterally dark and ventrally at sides yellow, in the middle dark. Male genitalia with large surstyli fused with epandrium. Postgonites comparatively long.

Distribution: N Africa and C Asia.

Material studied: *Stenophthalmus typhae* Nartshuk, 1971.

Genus *Metopostigma* Becker, 1903: 146

Fig. 109.

Type species: *Chlorops tenuiseta* Loew, 1874.

Small, 2.0—3.5 mm, dusted yellow species with dark spot and typical shining black spot on the frontal triangle as well as white arista.

Head higher than long, yellow with black spots. Eyes large oval with vertical long axes, naked. Jowls broader than *ant*₃, with one row of white hairs. *vi* short pale. Cheeks not visible. Frons somewhat projecting, broader than long, dusted with numerous dark, at front pale *fr*. Frontal triangle of medium size, behind broad as frons, with straight side margins reaching well to middle of frons and from there still further as an indistinct narrow streak, yellow, dusted, with a rounded spot in

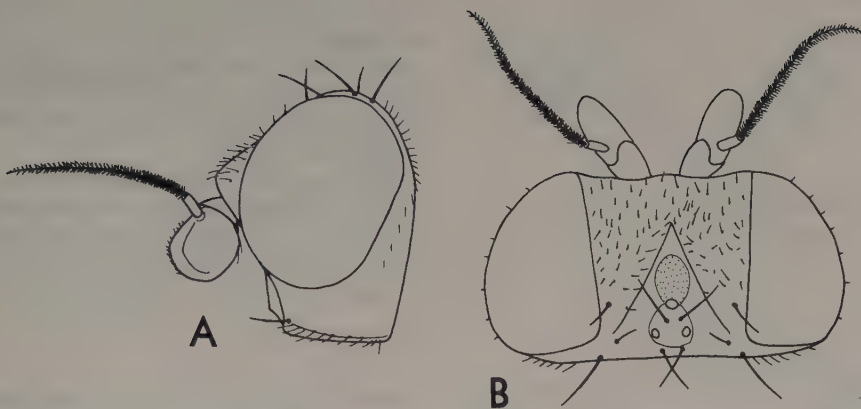


Fig. 109. — A—B. *Metopostigma sauteri* Becker. — A. Head, lateral view. — B. Head, dorsal view.

front of anterior ocellus shining, black and faintly striated. *if* indistinct along the margin of the triangle, upright. *oc* and vertical bristles distinct, dark. *oc* long, slightly procurved, divergent. *pvt* somewhat smaller, upright, cruciate. *vti* long as *oc*, incurved and procurved. *pvt* somewhat stronger, slightly outcurved. Indistinct, small, pale hair-like *orb* along eye margin and behind one distinct, black bristle-like, slightly recurved and outcurved *orb*, long as *pvt*. Pale postorbicular ciliation present. Occiput partly black. Face flat with a short, narrow, triangular carina. Clypeus narrow. Proboscis short. Palpi somewhat flattened with dark tip. *ant*₂ short pale. *ant*₃ longer than high, black, pubescent. Arista long, basal segments yellow, flagellum long, slender, white, thickly pubescent.

Thorax all over heavily dusted, with distinct bristles. Humerus with dark spot and 1 *h*. Mesonotum moderately convex, behind somewhat flattened, with three broad black stripes, smooth, heavily dusted, evenly covered with very short, dark hairs. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 smaller *p pa*, 1 *dc* twice as long as *p npl*. Scutellum large, rounded, flattened, yellow with dark disc, dusted, with numerous hairs. *ap sc* long as scutellum, straight, close together. 2—3 distinct *la sc*. Pleura smooth. *mpl* without hairs. *stpl* with dark, dusted spot and pale hairs.

Legs slender, pale, simple. Narrow tibial organ present.

Wings of Chloropinae-type. Halteres white.

Abdomen oval, dorsally black with a yellow central stripe, dusted, with dark hairs. The inflapped parts of tergites laterally yellow,

proximally black, dusted, with pale hairs. Female cerci slender.

Distribution: Palaearctic, Ethiopian and Oriental Regions.

Material studied: *Metopostigma sauteri* Becker, 1911, ♀.

Genus *Pseudopachychaeta* Strobl, 1902: 500

Figs 110, 119 I.

Type species: *Diplotoxa (Pseudopachychaeta) pachycera* Strobl, 1902.

Small species, 1—2 mm, with procurved veins r_{2+3} and r_{4+5} , and t_a and t_p close together.

Head higher behind than in front, about as long as posterior height. Eyes oval or somewhat broader in front, with horizontal long axes and sparse hairs. Cheeks widening behind, at middle not so broad as *ant*₃, with one row of pale hairs. 1 strong *vi*. Cheeks not visible. Frons not or very slightly projecting, about as long as broad, not shining, with few *fr*. Frontal triangle broad, behind almost width of frons, with almost straight side margins reaching about 3/4 length of frons and with a narrow stripe reaching front of frons, shining or thinly dusted, yellow or brownish. *if* in one row outside the margin of the triangle, procurved. *oc* very strong, procurved, divergent, *pvt* somewhat shorter, upright, cruciate. *vti* as long as *pvt*, incurved. *vte* strong as *oc* or even stronger, outcurved. 2—3 very strong, recurved *orb*. Occiput black. Face concave, without carina. Clypeus large, dark, dusted. Proboscis short. Palpi cylindrical. Antennae relatively large. *ant*₂ short with distinct bristle. *ant*₃ rounded or

and pregonites narrow, fused or indistinctly separated.

Distribution not clear due to lumping with *Lasiosina* and *Diplotoxa*. True *Pseudopachychaeta* are present at least in the Palaearctic and Oriental Regions.

Material studied: *Pseudopachychaeta pachycera* Strobl, 1902; *P. approximatonervis* (Zetterstedt, 1848) n. comb.; *P. ruficeps* (Zetterstedt, 1838) n. comb.; *P. heleocharis* (Nartshuk, 1964) n. comb.

Genus not attributed to a genus group

The genus *Phyladelphus* Becker has features of the head and thorax that are similar to those of *Chlorops* and *Parectecephala*. The head bristles are stronger and the frons is similar to that found in the *Assuania* genus group. However the arista is thickened, hairy and black. Because I have no information on the male genitalia I refrain from placing it in a genus group.

Genus *Phyladelphus* Becker, 1910: 54

Figs 111, 119 J.

Type species: *Phyladelphus thalhammeri* Becker, 1910.

Medium size, 2.5–3.0 mm, species, yellowish with black markings and thickened, black arista covered with thick pubescence.

Head higher than long, yellow with dark markings and long bristles. Eyes rounded with oblique long axes, naked. Jowls broad, somewhat broader than ant_3 , with one row of pale hairs. *vi* distinct, black. Cheeks linear. Frons somewhat projecting, broader than long, dusted, with few dark *fr*. Frontal triangle of moderate size, behind broad as half width of frons with sinuate side margins reaching front of frons as a narrow stripe, with a distinct groove inside the margin, largely dusted around the ocellar tubercle, otherwise shining, yellow but centrally more or less darkened. *if* in one row outside the triangle, procurved. *oc* rather long, procurved, divergent. *pvt* distinctly shorter, procurved, slightly divergent. *vte* and *vti* strong as *oc*. *vti* incurved and procurved, *vte* out-curved. About 6 recurved *orb*. Face flat, without carina. Clypeus large, dark, dusted. Proboscis very short. Palpi cylindrical. Antennae yellowish or black. ant_2 somewhat longer than

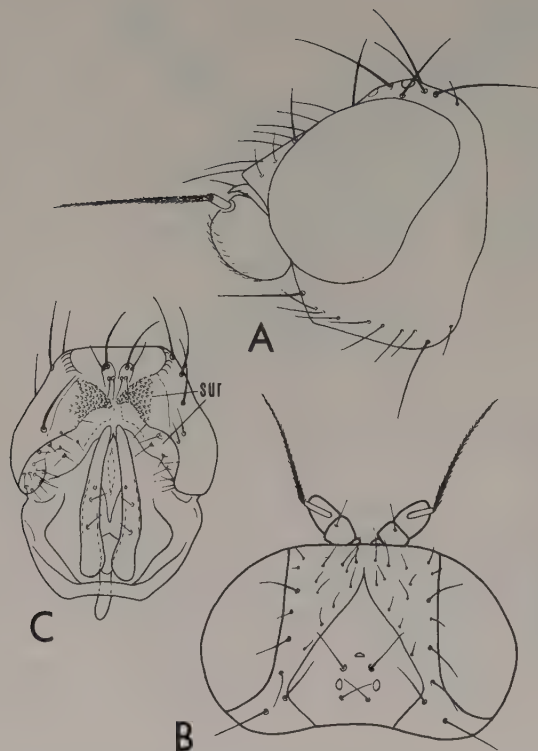


Fig. 110. — A—C. *Pseudopachychaeta approximatonervis* (Zetterstedt). — A. Head, lateral view. — B. Head, dorsal view. — C. Male genitalia, ventral view.

somewhat squarish, higher than long, with short pubescence. Arista dark, thickened or slender, pubescent.

Thorax yellow with black marking and well-developed bristles. Humerus pale with dark spot and 1 *h*. Mesonotum moderately convex, not flattened behind, with shallow depressions along *dc* lines, dusted, evenly covered with dark hairs. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 smaller *p pa*, 1 very long *dc*. Scutellum rounded, not flattened, yellowish, dusted, with few hairs on the disc. *ap sc* longer than scutellum. 1 *la sc*. Pleura more or less dusted. *mpl* without hairs. *stpl* with black spot and a few pale hairs.

Legs normal, pale or somewhat darkened, simple, without tibial organ.

Wings of *Diplotoxa*-type. r_{2+3} rather short. r_{2+3} and r_{4+5} procurved. r_{4+5} and m_{1+2} divergent. $t_a - t_p$ shorter than t_p . Halteres yellow or white.

Abdomen oval, brownish, dusted, with dark hairs. Female cerci normal. Sustyli coarsely granulate, fused with epandrium. Postgonites

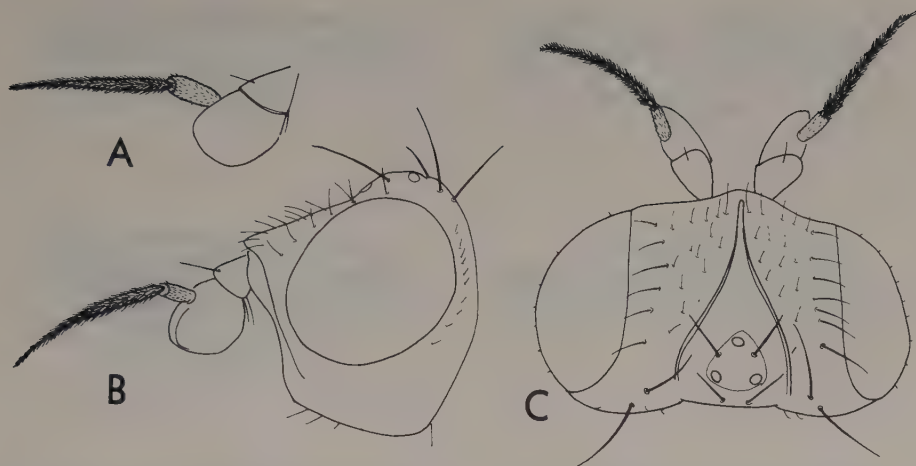


Fig. 111. — A—C. *Phyladelphus thalhammeri* Becker. — A. Antenna, inner side. — B. Head, lateral view. — C. Head, dorsal view.

broad. ant₃ oval, longer than broad. Arista black with long, thick pubescence, first aristal segment short, second long, thick and pubescent, flagellum more or less thickened.

Thorax yellowish with brown to black markings and distinct thoracic bristles, completely dusted. Mesonotum moderately convex, smooth, dusted, almost evenly covered with very short, dark hairs. 1 *a npl*, 2 *p npl*, 1 *a pa*, 1 small *p pa*, 1 strong *dc*. Scutellum rounded, convex, yellowish, dusted, with hairs on the disc. *ap sc* at least as long as scutellum. 1 strong *la sc*.

Pleura smooth. *mpl* without hairs. *stpl* with black spot and few pale hairs.

Legs slender, simple, pale, without tibial organ.

Wings of Chloropinae-type. *r*₂₊₃ rather long, recurved. Halteres yellow.

Abdomen oval, brownish, dusted with dark hairs. Ovipositor with complex internal structures.

Distribution: Europe, Africa.

Material studied: *Phyladelphus thalhammeri* Becker, ♀.

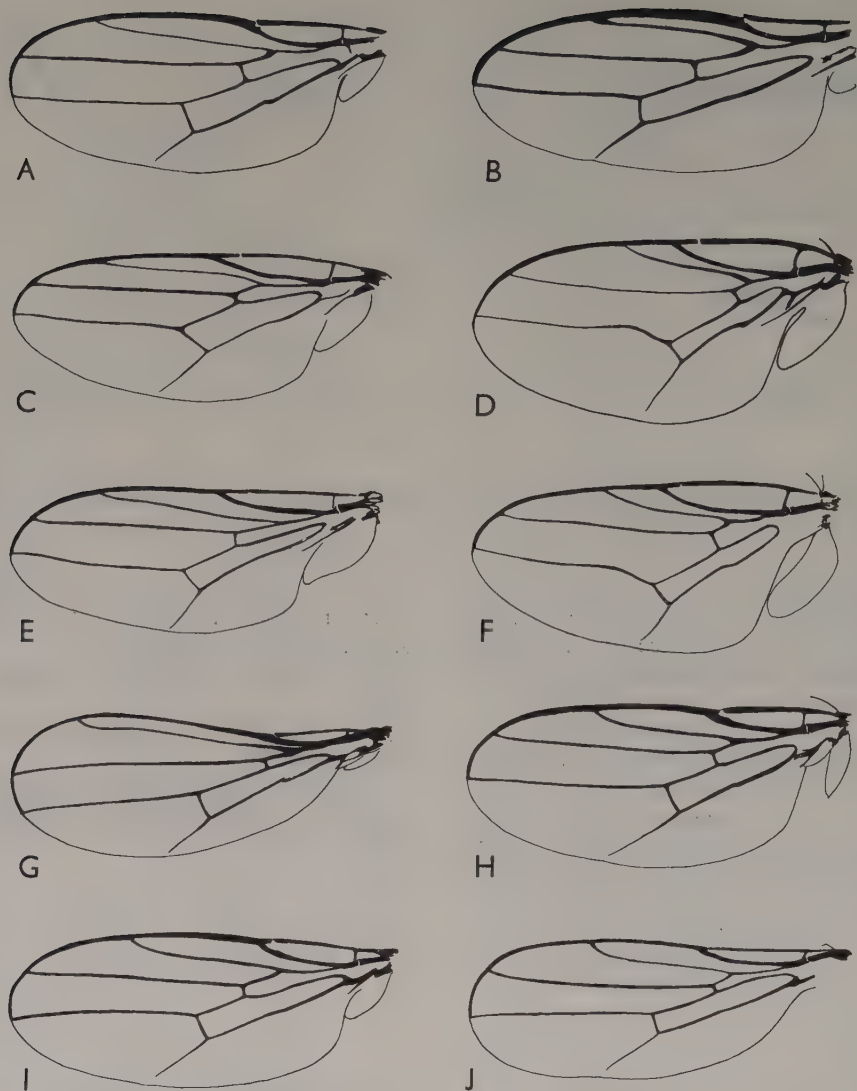


Fig. 112. — Wings. — A. *Lasiopleura longepilosa* Strobl. — B. *Siphonellopsis lacteibasis* Strobl. — C. *Scoliophthalmus trapezoides* Becker. — D. *Rhodesiella scutellata* (de Meijere). — E. *Dactylothyrea infumata* de Meijere. — F. *Euthyridium* sp. — G. *Javanoscinis meijerei* (Becker). — H. *Melanochaeta pubescens* (Thalhammer). — I. *Elachiptera cornuta* (Fallén). — J. *Disciphus alatus* Becker.

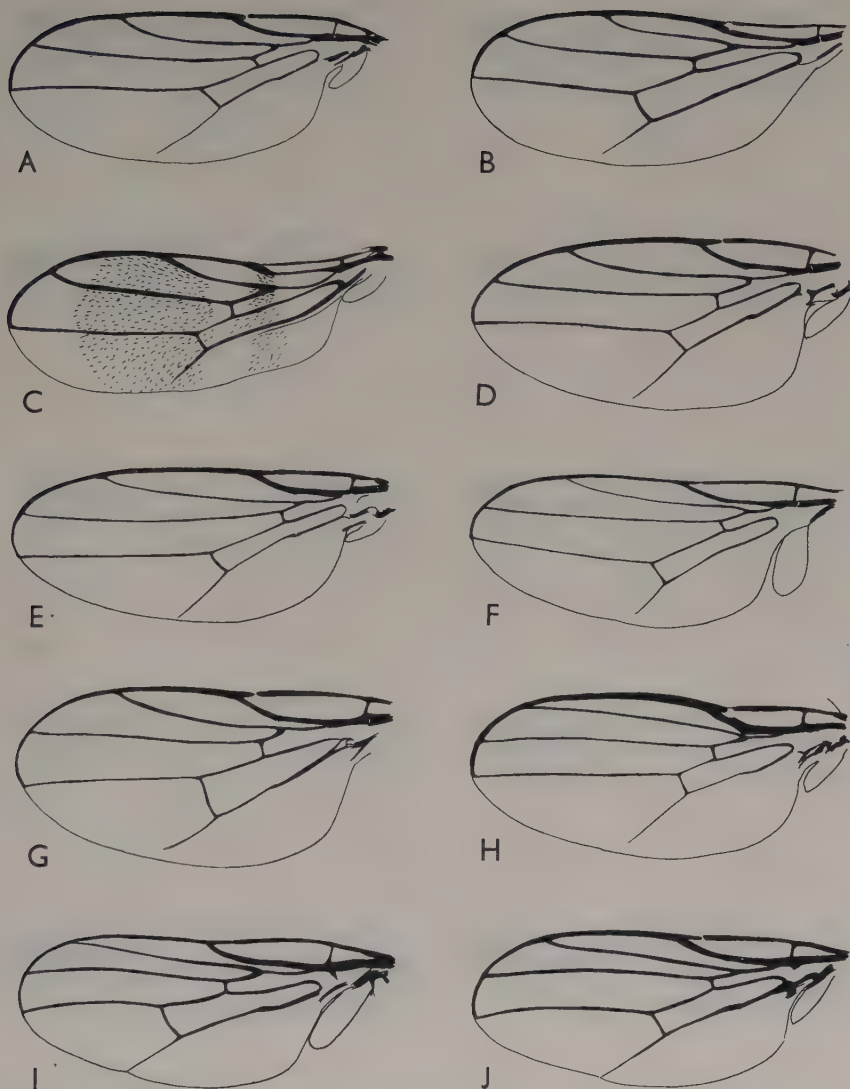


Fig. 113. — Wings. — A. *Cadrema ocellata* (Lamb). — B. *Anatrichus erinaceus* Loew. — C. *Spesidoscinis maculipennis* Hendel. — D. *Gaurax fascipes* Becker. — E. *Gampsocera mutata* Becker. — F. *Pseudogaurax sicarius* (Lamb). — G. *Cestoplectus intruens* Lamb. — H. *Dicraeus vagans* (Meigen). — I. *Lipara lucens* Meigen. — J. *Pseudeurina maculata* de Meijere.

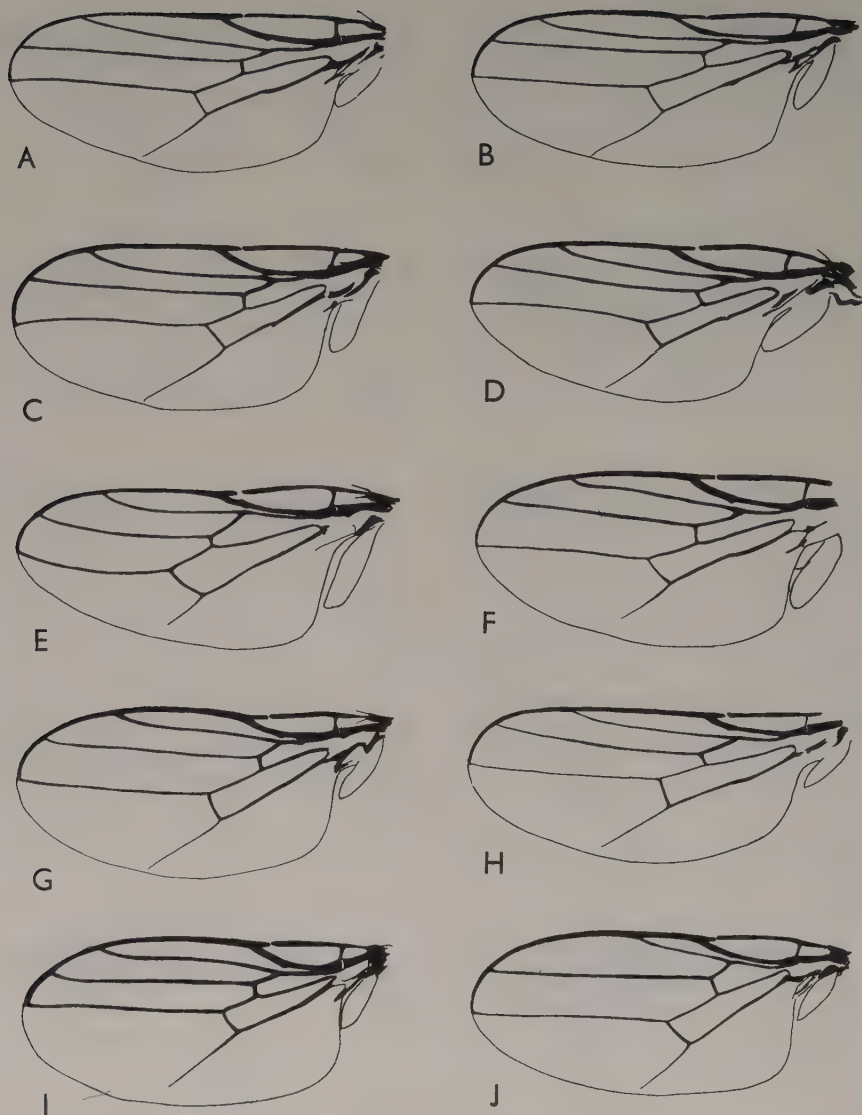


Fig. 114. — Wings. — A. *Pseudeurina miscanthi* (Nartshuk). — B. *Calamoncosis minima* (Strobl). — C. *Siphonella oscinina* (Fallén). — D. *Anomoeoceros hispidus* Lamb. — E. *Polyodaspis ruficornis* (Macquart). — F. *Fiebrigella palposa* (Fallén). — G. *Lasiambia brevibucca* (Duda). — H. *Aprometopsis flavofacies* Becker. — I. *Aphanotrigonella longinerve* (Nartshuk). — J. *Siphunculina aenea* (Macquart).

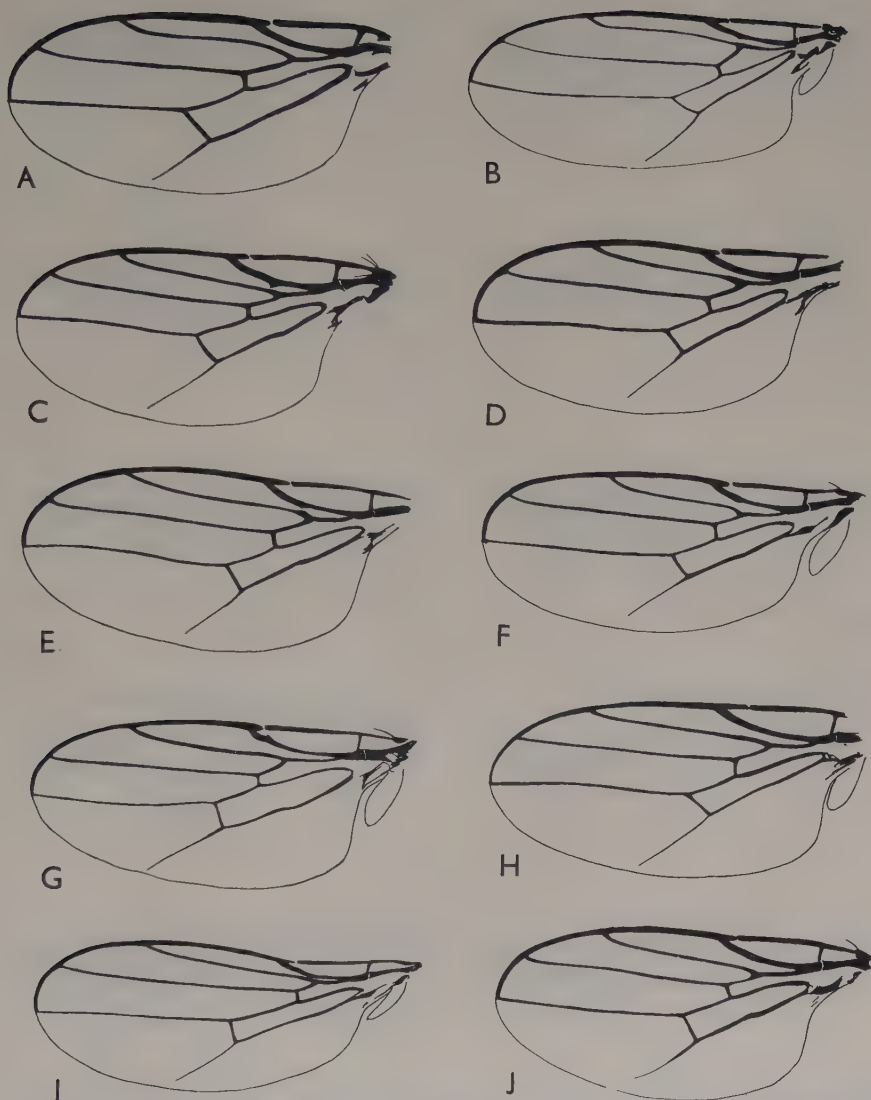


Fig. 115. — Wings. — A. *Aphanotrigonum trilineatum* (Meigen). — B. *Tricimba lineella* (Fallén). — C. *Trachysiphonella scutellata* (von Roser). — D. *Oscinimorpha minutissima* (Strobl). — E. *Conioscinella mimula* Collin. — F. *Tropidoscinis albipalpis* (Meigen). — G. *Oscinella frit* Linnaeus. — H. *Hapleginella laevifrons* (Loew). — I. *Lioscinella atricornis* (Zetterstedt). — J. *Pselaphia cornifera* Becker.

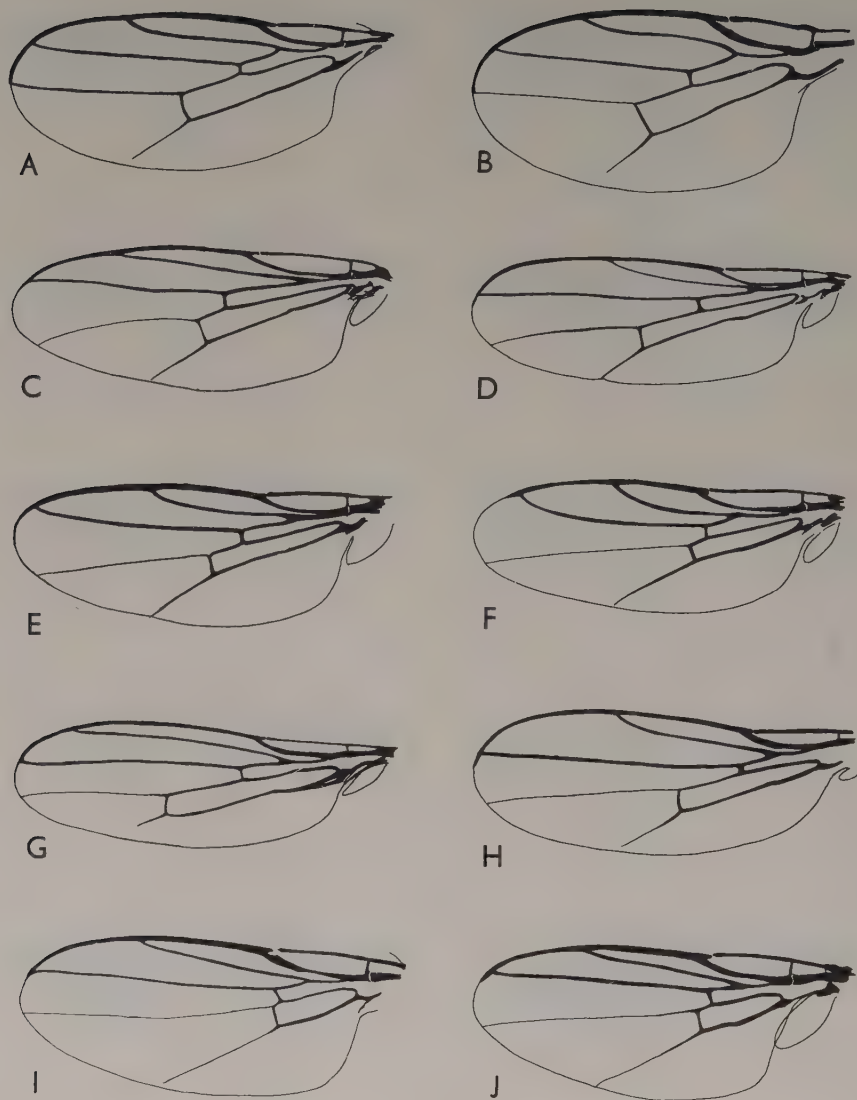


Fig. 116. — Wings. — A. *Eribolus nana* (Zetterstedt). — B. *Oscinisoma cognata* (Meigen). — C. *Platycephala planifrons* (Fabricius). — D. *Pachylophus frontalis* Loew. — E. *Meromyzella africana* (Loew). — F. *Meromyza saltatrix* (Linnaeus). — G. *Mepachymerus bauculus* Speiser. — *Steleocerellus ensifer* (Thomson). — I. *Semaranga dorsocentralis* Becker. — J. *Elachiptereicus abessynicus* Becker.

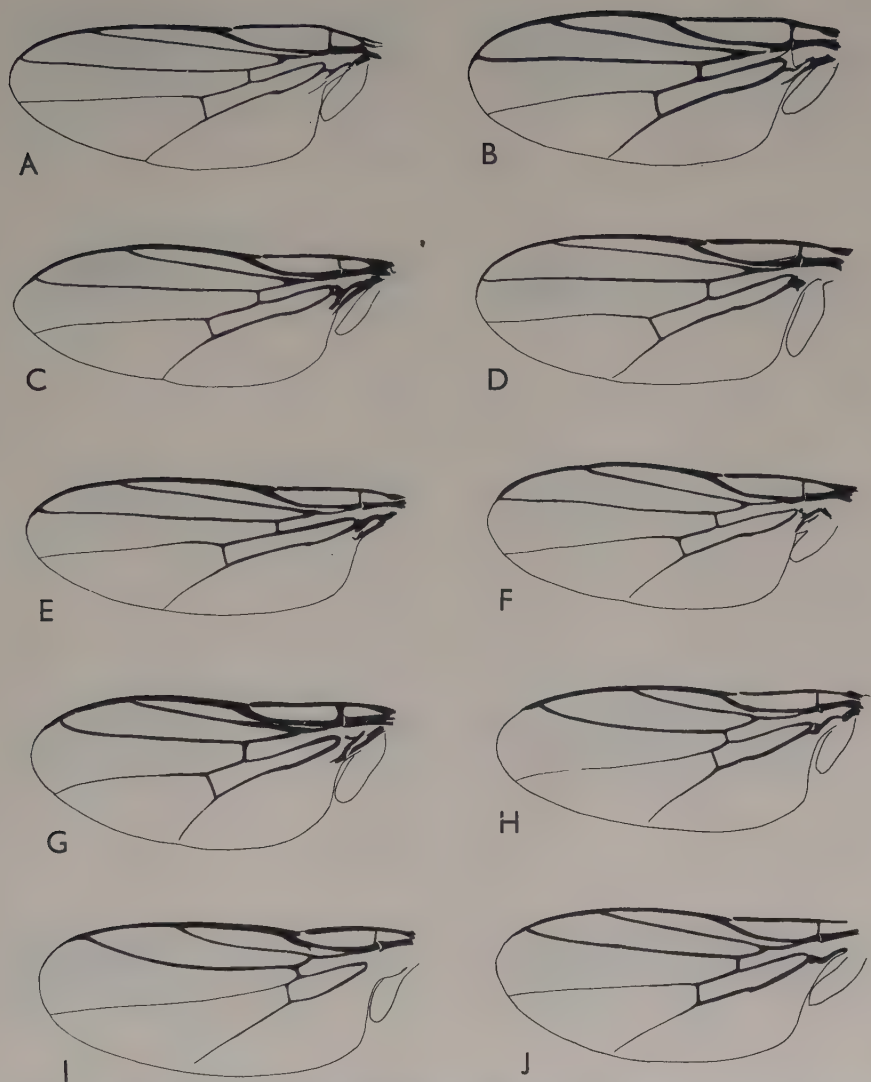


Fig. 117. — Wings. — A. *Chlorops pumilionis* (Bjerkander). — B. *Chlorops* (*Anthracophaga*) *strigula* (Fabricius). — C. *Anthracophagella sulcifrons* (Becker). — D. *Parectecephala longicornis* (Zetterstedt). — E. *Epichlorops puncticollis* (Zetterstedt). — F. *Melanum laterale* (Haliday). — G. *Capnoptera scutata* (Rossi). — H. *Diplotoxa messoria* (Fallén). — I. *Diplotoxa* (*Diplotoxoides*) *dalmatina* (Strobl) — J. *Cetema cereris* (Fallén).

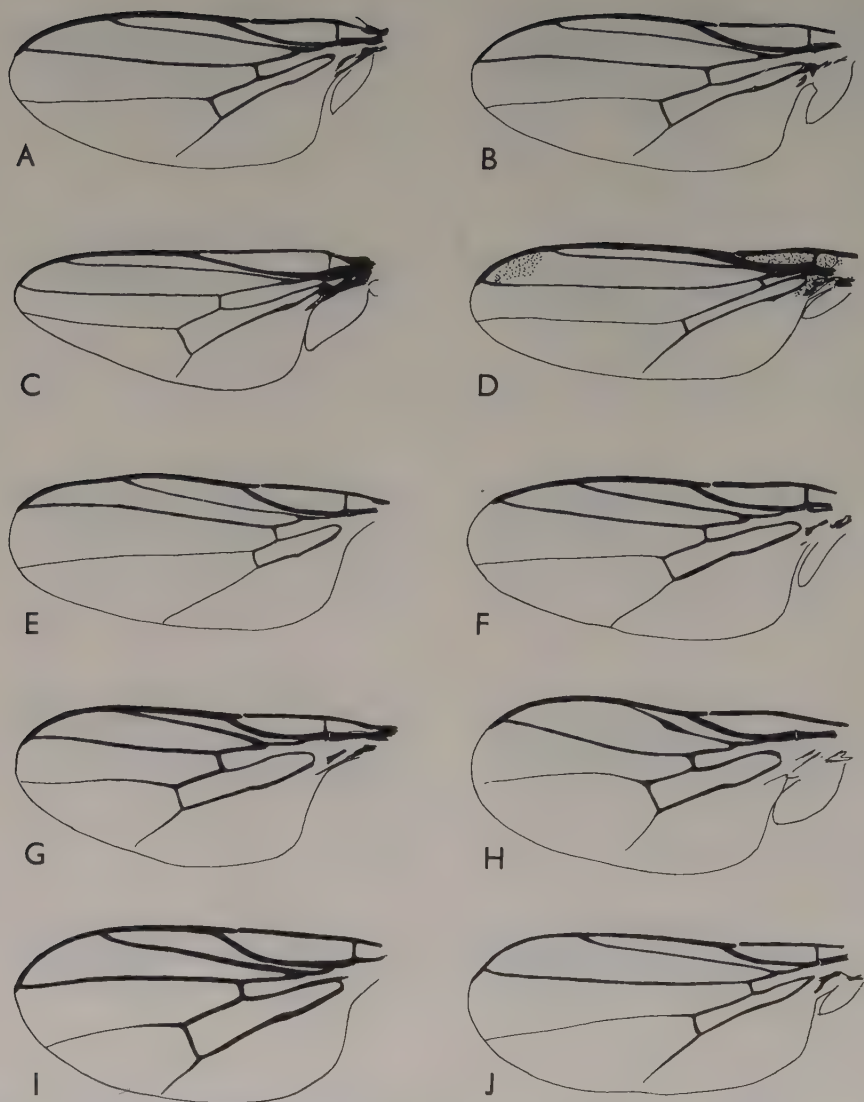


Fig. 118. — Wings. — A. *Thaumatomyia notata* (Meigen). — B. *Thaumatomyia* (*Chloropisca*) *glabra* (Meigen). — C. *Formosina lucens* (de Meijere). — D. *Thressa punctifera* (de Meijere). — E. *Cryptonevra flavitarsis* (Meigen). — F. *Eutropha fulvifrons* (Haliday). — G. *Bathyparia praeclara* Lamb, ♀. — H. Ditto, ♂. — I. *Cerats trifasciata* (de Meijere). — J. *Centorisoma elegantulum* Becker.

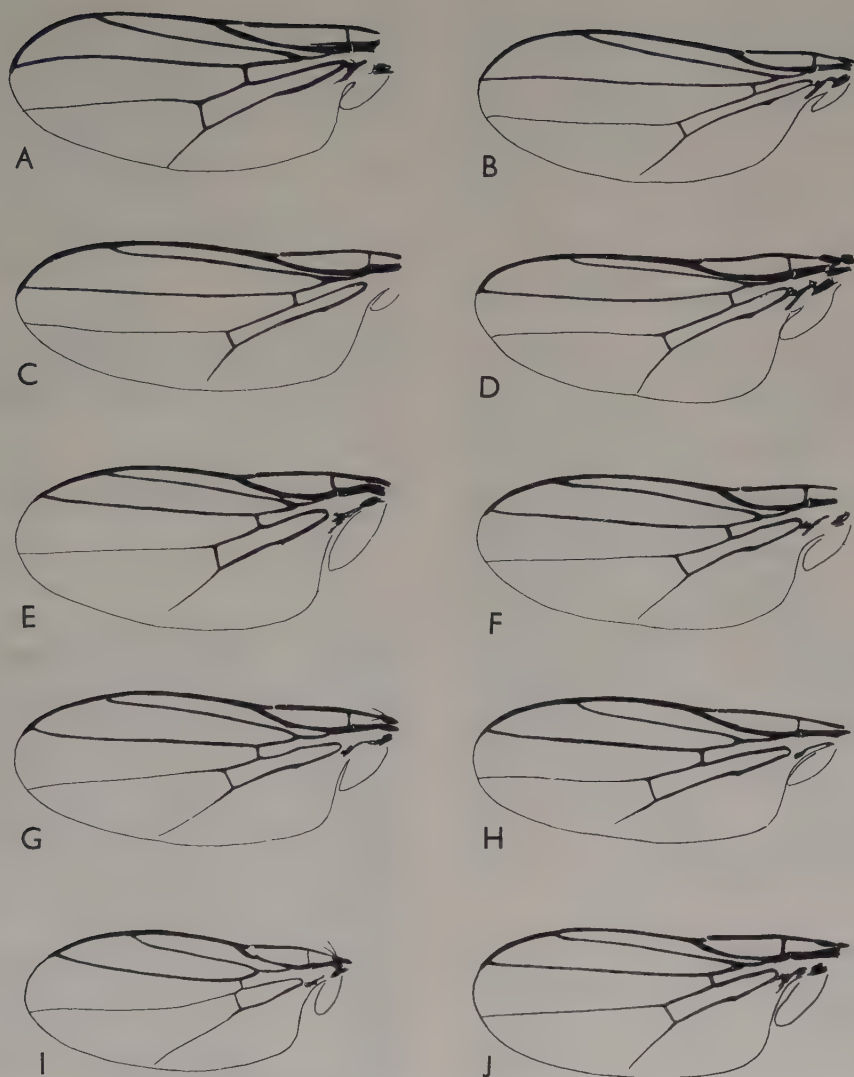


Fig. 119. — Wings. — A. *Pseudothaumatomyia macrocera* Nartshuk. — B. *Globiops brunescens* n. sp. — C. *Neoloxotaenia gracile* (de Meijere). — D. *Ensiferella ceylonica* n. sp. — E. *Assuania thalhammeri* Strobl. — F. *Lagaroceras megalops* Becker. — G. *Lasiosina cinctipes* (Meigen). — H. *Pseudopachychaeta pachycerina* (Strobl). — J. *Phyladelphus thalhammeri* Becker.

Phylogenetic relationships within the family Chloropidae

Among the genera treated here *Lasiopleura* Becker undoubtedly comes closest to the ground-plan condition of the family. It shows many of the characteristics of Diptera Schizophora at the same time as it has the general features of a chloropid. As a representative of the subfamily Siphonellopsinae it also shows the synapomorphies of this taxon, at least in a derived state. Because of the large differences between many characters within Siphonellopsinae and the relatively few genera studied it is difficult to decide which characters are synapomorphous for Siphonellopsinae and which are plesiomorphous, representing the ground-plan condition of Chloropidae.

The following characters I regard as synapomorphies for Siphonellopsinae:

- (1) 1 upper, incurved *h*.
- (2) The anteroventral corner of epandrium projecting, recurved.
- (3) Basiphallus large, thick-walled. Distiphallus distinctly more slender, membranous (fig. 25 G).

Within the subfamily these characters have changed, e.g. character (2) is lost in *Lasiopleura* and *Siphonellopsina* and character (3) is strongly changed in *Siphonellopsina*. The three-lobed surstylus is more or less distinctly developed in Siphonellopsinae (*Siphonellopsis*, fig. 25 E) but also the simple form with only the middle lobe present is represented (*Lasiopleura*, fig. 21 B—C). Within Siphonellopsinae there is an obvious tendency to reduction of bristles, especially the *dc* (except the posterior one) and *prs*, *pra* and *sa*.

The subfamilies Oscinellinae and Chloropinae seem to form a sister group to Siphonellopsinae, characterized by the following apomorphies:

- (1) *orb* not 3 and not outcurved and procurved but more numerous, shorter and recurved.
- (2) *if* more numerous, incurved or placed on the frontal triangle.
- (3) The 3 anterior *dc* lost.
- (4) *stpl*, *prs*, *prs*, and *sa* lost.
- (5) Male postabdomen symmetrical (*S*₆ vestige lost).
- (6) The strong inner basicostal bristle reduced.

Many of these transformations have already taken place within separate genera of Siphonellopsinae. As with many other character transformations within Chloropidae there seems to be a deeply rooted pre-disposition for changing these characters. From the present material it cannot be demonstrated that the Oscinellinae—Chloropinae stock is derived from any particular genus or other subgroup of Siphonellopsinae. The derived characters (1)—(9) are irregularly spread throughout the Siphonellopsinae when they occur in it.

The ground-plan condition of the subfamily Oscinellinae includes the following characters apomorphous in relation to the ground-plan condition of Siphonellopsinae and the Oscinellinae—Chloropinae stock.

- (1) Femural organ present.
- (2) Surstyli consisting only of the middle lobe (as in *Lasiopleura*); upper and lower lobes absent (remains (bristles) of lower lobe present in *Scoliophthalmus* (fig. 26 F) and *Anomoeceros* (fig. 47 D)).
- (3) Tendency to develop special structures on the scutellum (scutellum prolonged, cylindrical, conical, short and broad; scutellars arising from warts or finger-like projections, etc.).

The tribe Rhodesiellini combines a number of plesiomorphous features (divergent, procurved *oc*, hairy *mpl*) with a number of apomorphous characters, which are not unique but may be independently developed and are therefore synapomorphies for the tribe.

- (1) Frontal triangle large, shining, with numerous, long, incurved *if* along or on the margin of the frontal triangle.
- (2) Scutellum triangular, rectangular or oval with distinct warts or long projections.
- (3) Male cerci absent.
- (4) Phallus sclerotized and curved or with special inner sclerite (fig. 26 H).
- (5) Postgonites curved in a median direction.
- (6) Pregonites more or less distinctly bilobed, with strong bristles.

The tribe Oscinellini is characterized by the following apomorphous features present in its ground-plan condition.

- (1) *oc* upright, cruciate, or *oc* recurved, cruciate, convergent or parallel.
- (2) Male cerci not fused basally.
- (3) 2 *p npl*.

The male cerci of Siphonellopsinae are of various types. One type is that of *Siphonellopsina* with a broad mesolobus with two long bristles. A second type is that of *Lasiopleura* with a narrower, apically bifid mesolobus with the two long bristles present. A third type is that of *Protohippelates* with a long, narrow mesolobus. The two first types are present in Oscinellini, normally with the long bristles present. More common, however, are distinctly separated cerci. It is possible that the latter type is not an apomorphous one but is plesiomorphous and close to the ground-plan condition of Chloropidae. When the male cerci become reduced in Oscinellini they are in a lateral position (cf. *Dicraeus*).

The genus *Javanoscinis* is here with some doubt included in the Oscinellini. It has divergent, procurved *oc*, a plesiomorphous character present also in Rhodesiellini, from which it differs in having simple scutellum, naked pleura, male cerci of Oscinellini-type and different gonites.

Among the genus groups of Oscinellini the *Elachiptera* and the *Gaurax* genus groups are characterized by the apomorphy upright, cruciate *oc*. The differences occur mainly in the structure of the male genitalia.

The wings and male genitalia provide synapomorphies characterizing the *Dicraeus* genus group.

The *Lipara*, *Polyodaspis* and *Aphanotrigonum* genus groups form a complex characterized especially by the well-developed facial carina, a clear synapomorphy. There is a continuous reduction of this carina parallel with a

transformation of the simple femoral organ of the *Lipara* group. This transformation in one line leads to a complete loss of the femoral organ, in another line to an organ with warts in two or in one row. The almost complete loss of facial carina and the most advanced femoral organs are present in the *Oscinella* and the *Eribolus* genus groups.

The subfamily Chloropinae is characterized by the following apomorphous features present in its ground-plan condition.

- (1) 2 *p npl*.
- (2) Costa reaching tip of r_{4+5} or slightly beyond it, not to tip of m_{1+2} .
- (3) Apical segment of m_{1+2} weakened.
- (4) Male cerci fused into an apically not bilobed mesolobus.
- (5) Surstyli with three well-developed lobes.
- (6) Tendency to develop yellow or green pigments in the epidermis.

For some of the presented genus groups it is not possible to state generally present synapomorphies. Within some of the groups the synapomorphies for the group are present in some genera in a more apomorphous state than that of the ground-plan condition.

The *Platycephala* genus group is characterized by the thickened hind femora and the curved t_3 . This character is gradually lost in some of the included genera or completely absent. Structures of the head and thorax connect such genera as *Eurina*, *Trichieurina* and *Camarota* with this genus group. However, apomorphous genital characters of *Meromyza* point towards the *Chlorops* genus group (*Capnoptera*) and apomorphous genital characters of *Eurina* points towards the *Diplotoxa* genus group.

The antennae and genitalia of the *Semaranga* and *Mepachymerus* genus groups give synapomorphies for them but these structures also point towards *Pachylophus*.

The *Chlorops* genus group is well defined by the special arrangement of the pregonites. Only *Capnoptera* with its similarities with *Meromyza* is dubious.

The *Diplotoxa* genus group is defined by the apomorphies in phallic complex and wing venation.

The *Cetema* and *Thaumatomyia* genus groups show a common synapomorphy in the structure of the gonites in that the postgonites and pregonites in both groups are partly situated side by side. In the ground-plan condition of the subfamily these gonites meet end to

end. The epandrium of *Cetema* is special and the scutellum defines the *Thaumatomyia* genus group.

The *Cryptonevra* genus group has a special basiphallus.

The *Eutropha* genus group presents synapomorphies in the middle lobe of surstylus, in the antennae and the situation of hairs and bristles.

The *Neoloxotaenia* genus group is characterized by the unique secondary sclerite lateral to the anus.

The apomorphies of the *Centorisoma* genus group are not too obvious but there are many small special features in the male genitalia: subanal lobe, middle lobe of surstylus and gonites.

The *Assuania* genus group forms a monophyletic taxon with synapomorphies especially in the hypopygium due to the fusion of surstyli and epandrium.

Concluding remarks

When I started on this work my intention was to make a strict phylogenetic study in the sense of Hennig, to reconstruct the phylogeny of the family and to use it as a base for classification.

In spite of the fact that representatives of more than half the genera at present recognized in the family were studied it has not been possible to reconstruct a complete phylogeny for the genera treated.

In most cases there is no problem to decide whether a character state is apomorphous or plesiomorphous. One thing is to make a number of such decisions, another is to prove that a number of similar apomorphous character states demonstrate synapomorphy, that is, to show that they belong to the same evolutionary line.

Inescapably it was necessary to evaluate the various character complexes. I might have overestimated the importance of certain characters such as the male genitalia or the ocellar bristles. On the other hand such characters as wing venation (e.g. approximated crossveins) shape of antenna and arista (e.g. reniform ant₃ or sword-like arista), dusting, microsculpture, general pilosity etc. are undoubtedly subject to too much convergent evolution for them to be useful as synapomorphies proving taxa of higher rank.

A more complete knowledge of the subfamily Siphonellopsinae in particular would

facilitate the evaluation of the phylogenetic importance of the many different character transformation series present within the family.

A suspicion arises in this context. The family could be too young and diversified to fit the phylogenetic method; i.e. the secondary dichotomy might be too incompletely developed.

Another factor obscuring the phylogeny and making phylogenetic analyses difficult is the fact that it is not the characters themselves in their various character states that are most important for the future development of an evolutionary line, but the inherent capacity or "readiness" to develop certain characters at suitable times and in suitable situations. If evolution acts in this way, the same character state in two taxa does not necessarily indicate any close relationship. The similarities are then only incidental manifestations of a widespread disposition.

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sexual armature of Diptera. I. — Ent. mon.
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- m_{3+4} : fifth longitudinal vein
mes: mesolobus, fused cerci
 mg_1, mg_2, mg_3, mg_4 : first—fourth costal segment
mn: metanotum, mesophragma
mpl: mesopleuron
 mt_1, mt_2, mt_3 : first—third metatarsus
npl: notopleuron
ph: phallapodeme
ph s: phallapodemic sclerite
pog: postgonite
pph: phallic paraphyses
prg: pregonite
prpl: propleuron
ptpl: pteropleuron
 r_1 : first longitudinal vein
 r_{2+3} : second longitudinal vein
 r_{4+5} : third longitudinal vein
sc: subcostal vein
sp: spiracle
stpl: sternopleuron
s tr: sensillum trichodeum
sur: surstylus, paralobus
 t_1, t_2, t_3 : first—third tibia
 t_a : r—m crossvein
 t_p : m—m crossvein
acr: acrostical macrochaetae (hairs or bristles)
a npl: anterior notopleural bristle
a pa: anterior postalar bristle
ap sc: apical scutellar bristle
dc: dorsocentral macrochaetae (hairs or bristles)
fr: frontal bristle
h: humeral bristle
if: interfrontal bristle
la sc: lateral scutellar bristle
oc: ocellar bristle
orb: orbital bristle
p npl: posterior notopleural bristle
p pa: posterior postalar bristle
pra: prealar bristle
prpl: propleural bristle
prs: presutural bristle
psc: prescutellar bristle
pst: peristomal bristle
pvt: postvertical bristle
sa: supraalar bristle
sc: scutellar bristle
scp: scapular bristle
vte: outer vertical bristle
vti: inner vertical bristle

Abbreviations

aed: aedeagus
 ant_1, ant_2, ant_3 : first—third antennal segment
bph: basiphallus
c: costal vein
 cx_1, cx_2, cx_3 : first—third coxa
dph: distiphallus
ej ap: ejaculatory apodeme
ep: epandrium
ep s: ventral epandrial sclerite
 f_1, f_2, f_3 : first—third femur
hpl: hypopleuron
hyp: hypandrium
m: mesonotum
 m_{1+2} : fourth longitudinal vein

H: humeral spot
HPL: hypopleural spot
 M_1 : central mesonotal stripe
 M_2 : inner lateral mesonotal stripe
 M_3 : outer lateral mesonotal stripe
MN: metanotal spot
MPL: mesopleural spot
PRPL: propleural spot
PTPL: pteropleural spot
S: sternite
STPL: sternopleural spot
T: tergite

Index

Synonyms in *italics*. Non-chloropids within brackets

- (Acartophthalmus Czerny, 1902) 21
 Alombus Becker, 1914 40
 Anatrachus Loew, 1860 72
 Anomoeoceros Lamb, 1918 90
Anthobia Lioy, 1864 148
 Anthracophaga Loew, 1866 140
 Anthracophagella n. gen. 141
 Aphanotrigonella Nartshuk, 1964 98
 Aphanotrigonum Duda, 1932 101
 Aprometopis Becker, 1910 97
 Aragara Walker, 1860 40
Aspistyla Duda, 1933 58
 Assuania Becker, 1903 173
- Bathyparia Lamb, 1917 162
Botanobia Lioy, 1864 77
Botanobiinae Malloch, 1913 55
- Cadrema Walker, 1860 71
 Calamoncosis Enderlein, 1911 86
 Camarota Meigen, 1830 131
 Capnoptera Loew, 1866 146
Centor Loew, 1866 150
Centorella Strand, 1928 151
 Centorisoma Becker, 1910 171
 Cerais van der Wulp, 1881 163
 Cestoplectus Lamb, 1918 80
 Cetema Hendel, 1907 150
Chaetaspis Nishijima, 1954 67
Chaetoscelis Nartshuk, 1963 54
Chalcidomyia de Meijere, 1910 155
 Chloropidae Rondani, 1856 45
 Chloropinae Rondani, 1856 117
 Chloropisca Loew, 1866 154
 Chlorops Meigen, 1803 138
 Chromatopterum Becker, 1910 152, 155
 Conioscinella Duda, 1929 107
Coomanimyia Séguy, 1938 155
Cotilea Lioy, 1864 138
Crassiseta von Roser, 1840 68
 Crassivenula Sabrosky, 1941 104
Cryptoneura Enderlein, 1911 158
 Cryptonevra Lioy, 1864 158
 Cyrtomomyia Becker, 1913 66
- Dactylothyrea de Meijere, 1910 58
 Desertochlorops Nartshuk, 1966 175
Dicraeinus Enderlein, 1936 82
 Dicraeus Loew, 1873 82
- Diplotoxa Loew, 1863 148
 Diplotoxoides n. subgen. 150
 Disciphus Becker, 1911 70
- Echimba Duda, 1935 104
Echinia Paramonov, 1961 72
Echiniidae Paramonov, 1961 45
 Elachiptera Macquart, 1835 68
 Elachiptereicus Becker, 1909 136
Elaphaspis Bezzi, 1912 58
 Ensiferella n. gen. 169
Epicelyphus Becker, 1911 = Nomba Walker
 Epichlorops Becker, 1910 144
 Epimadiza Becker, 1910 91
 Eribolus Becker, 1910 114
 Eudicraeus Nartshuk, 1967 83
Eurhina Westwood, 1840 128
 Eurina Meigen, 1830 128
Eurinella Meunier, 1893 88
Euryparia Becker, 1911 163
 Eutropha Loew, 1866 161
 Euthyridium Frey, 1923 61
- Fiebrigella Duda, 1921 93
 Formosina Becker, 1911 155
- Gallomyia* Nartshuk, 1965 83
 Gampsocera Schiner, 1862 77
 Gaurax Loew, 1863 77
 Globiops n. gen. 166
Goniopsis Duda, 1929 93
Goniopsita Duda, 1930 93
Gymnopoda Macquart, 1835 85, 88
- Hammaspis* Duda, 1930 102
 Hapleginella Duda, 1933 111
Haplegis Loew, 1866 158
Hemisphaerisoma Becker, 1911 155
 (Heringiinae Enderlein, 1934) 55
 Hippelates Loew, 1863 66
Hippelatinae Duda, 1930 46, 55
 Homalura Meigen, 1826 158, 160
 Homops Speiser, 1923 152, 157
- Javanoscinis n. gen. 65
- Lagaroceras Becker, 1903 174
 Lasiambia Enderlein, 1936 94
Lasiochaeta Corti, 1909 67

- Lasiopleura* Becker, 1910 47
Lasiosina Becker, 1910 176
(Leptocera Olivier, 1813) 38
Liomicroneurum Enderlein, 1911 100
Lioscinella Duda, 1929 112
Lipara Meigen, 1830 85
Liriomicroneurum Duda, 1933 100
Loxotaenia Becker, 1910 168
- Macrochaetum* Corti, 1909 68
Macrochetum Rondani, 1856 68
Macrostyla Lioy, 1864 58
Macrothorax Lioy, 1864 92
Madiza Fallén, 1810 88
(Madiza Fallén, 1810) 22
Melanochaeta Bezzi, 1906 67
Melanum Becker, 1910 145
(Meoneura Rondani, 1856) 22
Mepachymerus Speiser, 1910 132
Meromyia Zetterstedt, 1860 121
Meromyza Meigen, 1830 121
Meromyzella n. gen. 121
Meroscinis de Meijere, 1908 58
Metopostigma Becker, 1903 178
Microneurum Becker, 1903 98
Minda Paramonov, 1956 164
Mindidae Paramonov, 1956 45
Myrmecomorpha Corti, 1909 68
Myrmecosepsis Kertész, 1914 73
- Neolachiptera* Séguy, 1938 68
Neogaurax Malloch, 1914 77
Neoloxotaenia Sabrosky, 1964 168
Neolicanabates Duda, 1930 109
Neuropachys Thalhammer, 1913 104
Nomba Walker, 1859 56
Notonaulax Becker, 1903 102
- Omochaeta* Duda, 1931 47
Ops Becker, 1910 = *Homops* Speiser
Opsiceras Séguy, 1946 136
Oscinella Becker, 1909 110
Oscinellinae Becker, 1910 55
Oscinellini Becker, 1910 63
Oscinelloides Malloch, 1940 47
Oscinidae Fallén, 1820 45
Oscinimorpha Lioy, 1864 106
Oscinis Latreille, 1804 138
Oscinisoma Lioy, 1864 115
Oscinomorpha Enderlein, 1911 (emend.) =
Oscinimorpha Lioy
Oscinosoma Enderlein, 1911 115
Oscinosminae Enderlein, 1911 55
Oxyapium Becker, 1912 82
- Pachychaeta* Bezzi, 1895 67
Pachychaeta Loew, 1845 68
Pachychaetina Hendel, 1907 67
- Pachylophus* Loew, 1858 124
Palaeoscinellinae Duda, 1930 46, 55
Parahippelates Becker, 1911 47
Parastia Pandellé, 1898 82
Parectecephala Becker, 1910 143
Paroedesiella Enderlein, 1936 83
Pemphigonotus Lamb, 1917 164
Phlyarus Gistel, 1848 126
Phyladelphus Becker, 1910 180
(Phyllomyza Fallén, 1823) 23
Platycephala Fallén, 1820 126
Platycephalisca Nartshuk, 1959 125
Polydecta Gistel, 1848 128
Polyodaspis Duda, 1933 92
Prohippelates Malloch, 1913 71
Protohippelates n. gen. 50
Pselaphia Becker, 1911 116
Pselaphila Becker, 1912 116
Pseudeurina de Meijere, 1904 83
Pseudoformosina Malloch, 1938 161
Pseudogaurax Malloch, 1915 79
Pseudohippelates Malloch, 1913 47
Pseudopachychaeta Strobl, 1902 179
Pseudothaumatomyia Nartshuk, 1963 165
- Rhodesiella* Adams, 1905 58
Rhodesiellini n. trib. 55
- (Scenopinus* Latreille, 1802) 44
Scoliophthalmus Becker, 1903 56
Semaranga Becker, 1911 135
Sepsidoscinis Hendel, 1914 75
Siphilus Loew, 1858 32
Siphonella Macquart, 1835 88
Siphonellopsina n. gen. 50
Siphonellopsinae Duda, 1932 46
Siphonellopsis Strobl, 1905 54
Siphunculina Rondani, 1856 98
Steleocerellus Frey, 1961 134
Steleocerus Becker, 1910 132
Stenophthalmus Becker, 1903 177
Stizambia Enderlein, 1936 86
Syphonella Perris, 1839 88
Syphonerina Séguy, 1938 104
- Tachinoceras* de Meijere, 1924 61
Thaumatomyia Zenker, 1833 152
Thressa Walker, 1860 155
Togeciphus Nishijima, 1955 67
Trachysiphonella Enderlein, 1936 105
Trichieurina Duda, 1933 130
Tricimba Lioy, 1864 102
Tricymba von Marschall, 1873 102
Tropidoscini Enderlein, 1911 109
- Uranucha* Czerny, 1903 155
Xena Nartshuk, 1964 158, 160

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